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AVIATION DIGEST

MAY/JUNE 1992

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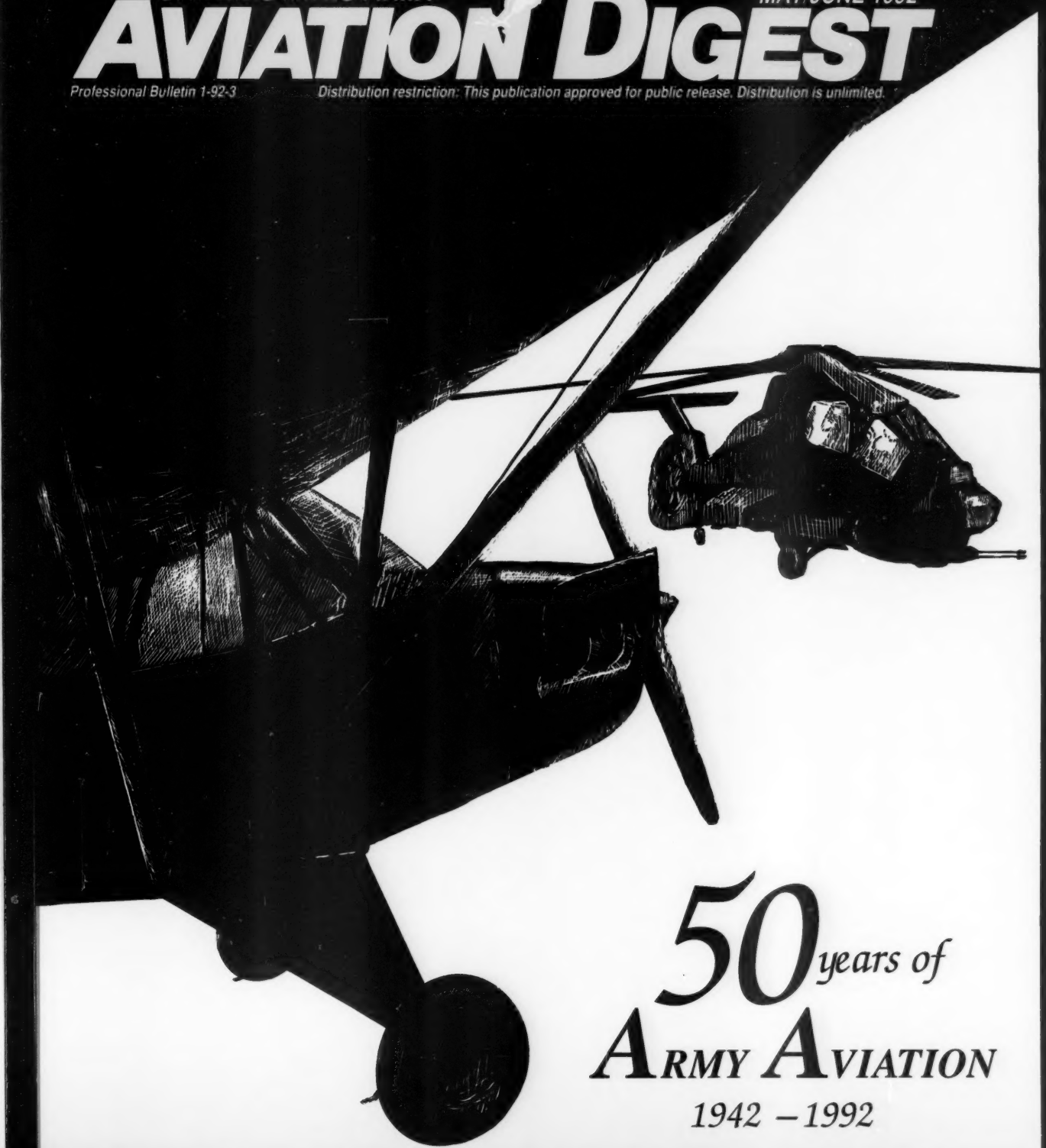

50 years of ARMY AVIATION

1942 – 1992

AVIATION DIGEST

PROFESSIONAL BULLETIN

1–92–3 • MAY/JUNE1992

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Back Cover: **50 Years of Army Aviation**

Cover: **This issue commemorates Army Aviation's 50 years of growth and change and its progressively increasing role on the battlefield...from the single-engine L-4 Piper Cub (foreground), Army's principle observation aircraft in World War II (pages 10-17), to the state-of-the-art RAH-66 Comanche (background), a computerized, adverse weather, night-and-day armed reconnaissance/attack helicopter, self-deployable worldwide (pages 36-61).**

Major General Dave Robinson
Commander, U.S. Army Aviation Center

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Major General Dave Robinson

50th Anniversary of Army Aviation

From North Africa to North Korea, from the islands of the South Pacific to the deserts of Southwest Asia, from the plains of Central Europe to the jungles of Indochina, and from the night patrols over the waters of the Caribbean to the night invasion of Panama City, Army Aviation was there, when needed. That sums up the past 50 years of Army Aviation.

Army Aviation, born out of necessity on 6 June 1942, and the newest of the combat arms, has been battle tested in six armed conflicts during its brief 50-year history. From its humble beginnings, with the flights of the L-4 Grasshopper as spotter planes for the field artillery during World War II, to our latest success in the Persian Gulf, flying the most advanced aircraft the world's industrial base has to offer, Army Aviation has established itself as a true combat multiplier.

This June marks the 50th anniversary of Army Aviation as we know it today. We have come a long way since the "Class Before One." Thousands of fixed-wing and rotary-wing Army aviators have joined the ranks and fought for our country because they believed what they were doing would make a difference, and they were right. Since its inception, Army Aviation has contributed to our nation's successes in every conflict.

Army Aviation has not developed over the past half century without a struggle. It took the monumental courage and relentless efforts of great visionaries to overcome the ridicule and the roadblocks that the Army traditionalists put up at every turn.

These visionaries have forever changed the way that the Army fights:

- Lieutenant Colonel William W. Ford, Commander of the "Class Before One."
- Colonel Jay D. Vanderpool, and his staff, who not only dared to think about, but also experimented with, machineguns and rockets on helicopters.
- Lieutenant General Gordon B. Rogers, whose 1960 Board determined that Army Aviation should move forward with its modernization plan and produce the UH-1 Iroquois and the CH-47 Chinook, among other aircraft.
- Major General (MG) Hamilton H. Howze, who chaired the Howze Board that developed and proved the concept of modern airmobility.
- MG Carl E. McNair, who worked with General Edward C. Meyer, then Army Chief of Staff, to make the dream of an Aviation Branch a reality.

- MG Ellis D. Parker, the first Aviation Branch Chief, responsible for fielding so many of our modern and most lethal systems, such as the AH-64 Apache, OH-58D Kiowa Warrior, UH-60 Black Hawk, and CH-47D Chinook.

The world has changed dramatically over the past 50 years. The cold war has ended and we have replaced our old military strategy of war deterrence with one of war avoidance. The Department of Defense is undergoing major restructuring and reshaping. The world is at war in no less than 30 locations today. Yet, we continue to downsize our military forces. The threats to our national security did not disappear with the collapse of the Warsaw Pact. Future military operations will run the gambit from peacekeeping missions, to counterdrug operations, to fighting a major regional conflict. For the United States to maintain its position as the world's unilateral military power, we simply must have lethal, early deploying forces that are ready to fight at a moment's notice.

Army Aviation forces are a decided complement to the combined arms team. Army Aviation assets were among the first units to deploy in support of Operations Urgent Fury, Just Cause, and Desert Shield/Desert Storm. Army Aviation assets from the 160th Special Operations Regiment and the 4th Squadron, 17th Cavalry, patrolled the Persian Gulf to support Operation Prime Chance. Today, active duty and Reserve Component aviation units continue to help law enforcement officials fight the war on illegal drugs in this country and in nations abroad.

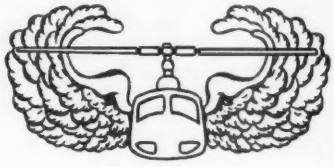
The future of the branch is bright. With the fielding of the AH-64 Longbow Apache, OH-58D Kiowa Warrior, and RAH-66 Comanche and the modernization of the AH-64, UH-60, and CH-47 fleets, Army Aviation's conventional helicopters will continue to be the most modern in the world. We also will reshape our fixed-wing fleet, maintaining only our four most modern systems.

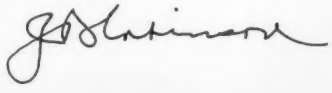
The role of Army Aviation has changed dramatically over the past half century. Our mission has expanded greatly from the days of field artillery adjustment. Today, Army Aviation must perform across the entire operational continuum.

From the first use of aviation on the battlefield by Thaddeus Lowe in 1861, Aviation has demonstrated that the ability to break friction with the ground is not a trivial capability. The training and the aircraft our aviators fly today have changed dramatically over the past 50 years, but one thing remains constant: the heroic acts of Army aviators throughout our history are legendary.

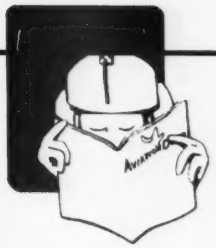
The names of distant battlefields and aircrews may have been forgotten, but the legacy that our predecessors have left for us will live on forever. We owe much to those early visionaries who saw that aviation possessed the unique ability to control the battlefield by reaching out and capturing the third dimension. They have forever changed the way that warfare will be waged.

"It wasn't always easy, and it wasn't always fair, but when freedom called we answered, we were there." Our mission is warfighting, and we must never forget it.





VIEWS FROM READERS



Editor:

I read the article "TEXCOM (Test and Experimentation Command) Test Noncommissioned Officer" in the November/December 1991 issue of the *U.S. Army Aviation Digest*. I would like to inform your readers that TEXCOM is not the only organization involved in the testing of Aviation assets. The U.S. Army Aviation Technical Test Center (USAATTC), Fort Rucker, AL, and the Aviation Qualification Test Directorate, Edwards Air Force Base (AFB), CA (a detached element of the test center), also are involved in many of the tests stated in your article. But I find no mention of that.

TEXCOM does have a lot to be proud of. They do a lot for the aviation community. But let's not forget that there are people, at Fort Rucker and Edwards AFB, who work these type tests, and others, on a regular basis.

I also would like to inform your readers that TEXCOM is not the only agency that has a test officer's course. Our command (U.S. Army Test and Evaluation Command) also has a course of which I am a graduate that prepares project officers for testing.

The statement that the TEXCOM test officer's orientation course contains sufficient subject matter for the award of the special skill identifier "R" is partially incorrect. The requirement for award of the "R" identifier is outlined in Army Regulation (AR) 611-201, *Enlisted Career Management Fields and Military Occupational Specialties*. It states that to qualify for award of the "R" identifier the individual must have successfully completed 60 days' on-the-job training in a designated research, development, test, and evaluation position and then be recommended by the unit commander. While the TEXCOM course may contain the need-to-know material, it does not suffice as a requirement for the award of the skill qualification identifier "R" in accordance with AR 611-201.

Finally, I would like to add that the test arena is the cutting edge. The noncommissioned officers (NCOs) assigned to this type duty are of the highest caliber. The duties we perform and the scope of those duties are far beyond "normal" NCO functions and go far beyond the "job description" of a 67 or 68 series military occupational specialty. While our peers are responsible for troops and their equipment, we are responsible for millions of Army test dollars—multimillion-dollar aircraft and aircraft systems.

We are here to ensure that the soldier gets a product he can trust and depend on to do what it was designed to do every time he uses it. That, in itself is a task most NCOs will never perform, but is a normal function of our everyday job. There is no other "job" in the Army that places the NCO in a position of such high responsibility, visibility, and accountability.

We appreciate your interest in our line of work and maybe your article will help dispel the rumor that this is just another cushy assignment. "Test for the Best."

SFC William M. Bauer
Project Coordinator
Maintenance Support Branch
USAATTC
Fort Rucker, AL

Editor:

The Sixth National Conference on High-Power Microwave (HPM) Technology will be held 24 through 28 August 1992 at the Hope Performing Arts Center, Air Force Training Command, Lackland Air Force Base (AFB), TX. The theme of the Conference is "HPM Technology for the 90s." The Conference and its proceedings will be classified SECRET, NO FOREIGN NATIONALS, and WARNING NOTICE—INTELLIGENCE SOURCES OR METHODS INVOLVED.

The Conference will provide a forum for technical exchange in both narrowband and wideband technologies, effects, and system concepts. Members of the Department of Defense and other Federal

agencies, their contractors, industry, and academia are invited.

Phillips Laboratory, Directorate of Advanced Weapons and Survivability, Kirtland AFB, NM, is sponsoring the Conference.

For information concerning the technical program contact Mr. Donald J. Sullivan, Technical Coordinator, Mission Research Corporation at commercial phone number 505-768-7670. For a complete registration packet contact Ms. Carolyn A. Keen, Conference Administrator, Bionetics Meeting Support Division at toll-free number 1-800-868-0330.

Editor:

The Test Technology Symposium V will be held 14 through 16 July 1992 at the Kossiakoff Conference and Education Center, Johns Hopkins University, Laurel, MD. The theme of the unclassified Symposium is "Meeting Test Technology Challenges Through Multiservice Partnerships."

The U.S. Army Test and Evaluation Command, Directorate for Technology, Aberdeen Proving Ground, MD, is sponsoring the Symposium.

For a complete information packet contact Ms. Carolyn A. Keen, Symposium Administrator at toll-free number 1-800-868-0330 or telefax 1-804-722-0894.

Editor:

In response to Major General (MG) Dave Robinson's invitation to submit aviation-related articles, "Let's Exchange Ideas," in the January/February 1991 issue of the *U. S. Army Aviation Digest*, I offer the following discussion on fixed-wing close air support (CAS) by the U.S. Army.

Army fixed-wing CAS is an idea whose time has come. Whether the mission is necessary is not an issue; that is a given. The issue is whether or not the Army should be doing the mission. In my opinion, "yes!"

Presently, the military is in transition. The name of the game now is efficiency. Conceptual changes are necessary; "packages" are in. The U.S. Air Force (USAF) recognizes this and is consolidating and collocating units into go anywhere, do anything units. The USAF's forte is strategic deterrence, heavy airlift, air refueling, an air superiority. That all is as it should be. The USAF also has the fixed-wing CAS mission whose job is to support, guess who, the U.S. Army. It would seem to make a lot more sense for the Army to be supporting the Army.

Army supporting Army: Army aviators supporting ground maneuver units doing tactics that they, Army aviators, study, understand, and appreciate. Army aviators who are at the beck and call of the ground commander, not removed by layers of interservice bureaucracy. Army aviators who sit in on Army tactical briefings, who 'speak Army,' who are intensely schooled on vehicle recognition, which is so necessary on the mobile battlefield, and who are rated by the Army chain of command. Army aviators who are an elite, to be sure, but who understand GP (general purpose) medium and MRE (meal, ready-to-eat).

Picture it. Army Aviation as a total package: helicopters for close in work; fixed-wing for deeper, heavier firepower work; and working with infantry, armor, and artillery under one Army command. That is a package; that is efficient. The conceptual change to achieve it is accomplished by allowing the Army to do the fixed-wing CAS mission.

The Army only needs another 500 feet above the ground to do the job. The USAF generally gives 500 feet and below to the Army for its helicopters. Fixed-wing CAS needs only another 500 feet or so on top of that to get the job done. The USAF can haul the Army to destination, air refuel the Army fixed-wing CAS aircraft to destination, clear the skies above with air superiority, and then let the Army go to work gaining the ground with all its assets, to include rotary- and fixed-wing aviation. Makes sense to me.

I am not the only one it makes sense to. The 1991 Defense Appropriations Act mandated the transfer of USAF A-10 Thunderbolt aircraft to the U.S. Army for OV-1 Mohawk aircraft being turned in. As reported in the September 1991 issue of the *Armed Forces Journal*, the Senate Armed Services Committee recently reiterated that mandate.

I am not so naive as to be unaware of the politics involved in such a transition. The USAF is giving up a mission and that means giving up dollars, sometime services are not wont to do. However, in the current fiscal environment, dollars are disappearing anyway. It would be best for the USAF to stick to its forte: strategic deterrence, heavy airlift, air refueling, and air superiority. Let the Army have the air-to-mud job.

I also am aware that the Army may first be hesitant to embrace the fixed-wing, CAS mission. There is simply not a lot of institutional knowledge within the Army to go about it. There is enough to begin.

Let us speak of OV-1 units and OV-1 aviators. I have been in the Active Army and on active duty with the

Army National Guard, for 14 years. These units and aviators can make the transition and do the job easy. I promise. Here is why I think so: I was an active duty USAF pilot for 5 years, have 2,000 hours in the OV-1, and I am an airline captain in civilian life. I have been around a lot of pilots in my life. A good pilot is a good pilot is a good pilot. A good OV-1 pilot will be a good A-10 pilot. Again, I promise.

While we are at it, let me offer another concept to get this thing started. The USAF, US Navy, and US Marine Corps have had aviator exchange programs for years. It is time the USAF and Army had one: Assign some Army OV-1 aviators to the USAF A-10 transition course. Upon graduation, send them out to USAF A-10 operational units. These Army aviators will be gaining fixed-wing CAS experience and, equally important, introducing Army dialogue to the mission. They will be with the USAF as equals. That is how to build communication and respect. And that is how to get this thing started. I have the background to help. Call me.

Is Army fixed-wing CAS achievable? Of course it is. Not without challenges, but it *is* achievable. Will it serve to create a more combat effective Army? Absolutely. And that is exactly why the U.S. Army should be doing the fixed-wing CAS mission.

LTC Lauran Paine
State Aviation Officer
Oregon Army National Guard

Editor:

I am writing to place the article "What is the SPH-4B?" in the March/April 1992 issue of the *U.S. Army Aviation Digest* in its proper perspective. Newer does not always mean better. Although, the development of the SPH-4B was well intended, in the rush to procure helmets for Operations Desert Shield and Storm, we somehow fell short on the quality control process.

Fielding of the SPH-4B is not without problems: Presently, night vision devices are still not authorized on the dual visor mount of the SPH-4B, pending research by the U.S. Army Safety Center, Fort Rucker, AL, on tilt adjustment. Although fielded without a technical manual, U.S. Aviation Systems Command, St. Louis, MO, is allowing aviation life support equipment (ALSE) shops to use the manual from the old SPH-4 when working on the new helmet. ALSE shop technicians have been able to get around the problem of no repair parts available by substituting parts from the old SPH-4. Parts that are available, such as the dark visor ($45.00), are inordinately expensive. Commanders will soon start feeling the impact on their ALSE budgets.

Two pages worth of quality deficiency reports have been submitted on the SPH-4B; unfortunately, the deficiencies may only be corrected on a very small portion of the helmets ordered. For the thousands and thousands of helmets that have already been issued, it will be the burden of ALSE technicians worldwide to correct problems such as: sending back cracked helmets, installing missing parts, attaching earcup seals with tape, etc.

Army Aviation can live with the SPH-4B but at the cost of a horrible headache to our hardworking ALSE technicians. Personally, I am treating my old SPH-4 with kid gloves so that I will not have to trade it in for a new helmet, which has chinstraps that choke and napestraps that prevent me from fully clearing the aircraft.

CW3 Alfred L. Rice
Aviation Safety Officer
1/14th Aviation Regiment
Aviation Training Brigade
Fort Rucker, AL

Editor:

Combined Arms Command-Training (CAC-TNG), Fort Leavenworth, KS, is the proponent for Army training management doctrine written in Field Manual (FM) 25-100, *Training the Force*, and FM 25-101, *Battle Focused Training*.

CAC-TNG is soliciting comments and suggestions from the field on how to revise and improve FM 25-101 to better meet the needs of the Active Army and Army Reserve before the next scheduled rewrite. Suggestions should include the specific recommendation, page, and paragraph as well as well as textual changes and additions. Use of Department of the Army Form 2028 (Recommended Changes to Publications and Blank Forms) also is recommended but not required.

Comments and recommendations should be sent to the Deputy Commanding General for Training, Combined Arms Command, ATTN: ATZL-CTT, Fort Leavenworth, KS 66027. Comments may be faxed to DSN 552-4458. If you have any questions contact Captain Bill Hedges at DSN 552-3919.

Readers can obtain copies of the material printed in this issue by writing to the Editor, U.S. Army Aviation Digest, ATZQ-PAO-AD, Fort Rucker, AL 36362-5042

Reshaping An Army

photo by Willard Owens

General Frederick M. Franks Jr
Commander, U.S. Army Training and Doctrine Command

by LTC Colin K. Dunn

*Excerpts from a recent interview conducted by Lieutenant Colonel Colin K. Dunn, Editor, **Field Artillery Professional Bulletin,** Fort Sill, OK, with General Frederick M. Franks Jr, Commanding General, U.S. Army Training and Doctrine Command, Fort Monroe, VA.*

As the Army moves toward a continental U.S. [CONUS]-based contingency force, what do you see as the capabilities critical to responding to crises?

General [Gordon R.] Sullivan [Chief of Staff of the Army] is reshaping our Army into a post-Cold War Army and not just a smaller version of our Cold War Army. We are reshaping both intellectually and in our training and leader development programs.

As we move toward a strategic Army, the majority of our forces will be in the United States. But forward presence also will be part of our national military strategy. So we'll deploy from either forward presence or CONUS locations.

With this strategy, rapid mobilization and deployment become increasingly important. The circumstances under which the Army can deploy are more ambiguous now than they were a few years ago. When we had the certainty of the Cold War contingencies, commanders trained and prepared to win in those particular circumstances.

Now we must be more versatile—mix and match units in tailored force packages, fight battles at the tactical and operational levels, and organize our contingency theater to defeat threats in many scenarios. This versatility is critical, but we've shown such versatility before. A lot of the capabilities we demonstrated in operations such as Just Cause and Desert Shield and Storm will continue to be important for our contingency Army in the future.

What are some of the greatest challenges the Army faces in training for joint operations?

First, we have to base our training on the situations we could face—the circumstances unified commanders need their forces to practice. We must have a relevant set of circumstances or conditions within which the training takes place.

Scenarios are very important in joint operations. So, as we watch scenarios being developed in unified commands, in our schools, leader development programs, and CTCs [combat training centers], they should be relevant for the U.S. Army now and in the future. Next, we must capitalize on the significant strengths each service brings to the operation and harmonize them in accordance with emerging joint and Army doctrine. For example, joint special operations at the JRTC [Joint Readiness Training Center, Fort Chaffee, AR] harmonize air-ground fires, both close and deep. As the organic fires of our Army systems reach out farther and farther—MLRS [multiple launch rocket system], cannon artillery, Army tactical missile system [Army TACMS], AH-64 Apaches—as the ground com-

mander can employ these assets at greater distances, that requires more coordination and more training in joint operations.

How do you see the Army's increasing the lethality of our early deploying forces in a contingency operation?

We can increase our lethality in several ways. The most talked about way is through materiel solutions. Certainly, we'll pursue developing the armored gun system [Armor's lightly armored gun system with a high-velocity cannon, which is transportable by C-130 Hercules aircraft]; HIMARS [Artillery's high-mobility, artillery rocket system, a lightweight, wheeled version of MLRS]; the Javelin [Infantry's one-man-operated, fire-and-forget, advanced antitank weapon with a 1.25-mile range]; and others that give us more lethality on the ground early.

Fielding the M119 light howitzer and adding fuel pods to UH-60 Black Hawks, Apaches, and the CH-47D Chinook plus the helicopters' capability to be refueled in midair give us lethality options early on. Our aviation now can self-deploy as well as deploy aboard ships and inside strategic aircraft. Again, ***versatility*** is key.

Depending on the contingency's circumstances, deployment means, and time available, the commander can increase the lethality of his deploying light forces by introducing other types of units early on. He can mix and match his light, special operating, and heavy forces to meet that particular threat.

You'll see more mixing and matching in your NTC [National Training Center, Fort Irwin, CA] and JRTC rotations as you train on contingency operations. Those CTCs are employing heavy and light forces in operations specifically aimed at developing versatility.

In the joint arena, our sister services are helping us get forces on the ground faster in contingencies. The Navy, for example, is committed to building more fast sea-lift ships in the next few years. So we'll see a dramatic improvement in our forces' ability to deploy by surface means. The Air Force has committed to the C-17 Airlifter. So our strategic transport aircraft capability is improving. Additionally, we can preposition Army materiel on ships at selected locations.

The materiel, force package, and other solutions to increasing our lethality early on are all part of being versatile enough to meet any contingency. What we don't want to do is get locked into inflexible ***formulas*** for specific scenarios. Our doctrine should guide us—describe how to ***think about*** mobilization and deployment—how to think in terms of versatile force mixing and matching in combat, combat support, and combat service support forces, etc. Using such doctrine, we would be flexible enough to organize and operate in any situation.

As the sponsor of the "Fighting with Fires" initiative being worked by the Field Artillery School, would you explain your notion of the combined arms commander's role in synchronizing operating systems?

My goal—with Major General [Fred F.] Marty, Brigadier General [Tommy R.] Franks [Field Artillery School Commandant and Assistant Commandant], and the Field Artillery School leading the way—is to ensure the Army makes the most of our increasingly lethal fires.

In what General George S. Patton called the "Musicians of Mars," the combined arms commander is the "conductor of his orchestra" of operating systems performing on the battlefield. He's responsible for pulling together all the elements of combat power to fight and win. In the tactical battle, major engagements or campaigns, the elements of combat power are the same: firepower, maneuver, protection, and leadership.

The combined arms commander must be as involved in the fires part of his battle as he is in the maneuver part. I want combined arms commanders Army-wide to know how to skillfully maneuver fires, and we accomplish that first in our doctrine and leader development programs and then in training. And I want those skills honed.

The lethality of our fires has increased significantly. During Desert Storm, in one-half hour we delivered more fires more effectively than World War II artillery could have delivered in 8 hours. So we have extraordinary fires capabilities—and the systems and munitions under development promise even greater lethality.

The maneuver commander must become the combined arms commander and fight more than the maneuver battle—know how to fight with fires and make them an integral part of the battle. He must be able to quickly maneuver and mass fires and skillfully employ counterfire. If the fire support officer [FSO] plans fires as a separate entity—not integrated in the total battle by the combined arms commander—the plan ends up having little relevance to the conduct of the battle. Fires are too important to be left solely to the artillery.

Fire planning by the FSO is certainly necessary, but the plan has to have an agility built in—an interrelationship with maneuver—to make the maximum contribution to winning. Planning is one thing, fighting is another. The fire plan can't be "put on automatic" and executed as though the enemy's not going to react to it. He will. In a fight, you've got two minds working on the same problem: the commander's and the enemy's.

Points of Main Effort

In this interview, General Franks emphasizes five "points of main effort" to guide TRADOC in helping to shape the Army for a changing world situation:

- Lead the Army through intellectual change.
- Propose modernization alternatives to maintain the technological edge for soldiers on future battlefields.
- Sustain excellence and relevance in training and leader development.
- Foster organizational excellence.
- Focus on soldiers.

How would you rate our ability to synchronize operating systems at the combat training centers?

I was enormously proud of the Desert Storm commanders' orchestrating capabilities, at least those I observed personally. Their abilities to synchronize fires and maneuver were superb. The 1st Infantry Division in the breach; the 1st Armored Division (United Kingdom) with the 142d Field Artillery National Guard from AR; and the 1st Cavalry Division in their raids, feints, and demonstrations; the artillery raids and counterfire ambushes with MLRS were all professional, skillful operations. The 1st and 3d Armored Divisions in their zones of action against the Iraqis demonstrated their success in employing massed fires. (I define "massed" as the fires of two or more battalions, not batteries.)

We need to continue this awareness of the capabilities of fires, an awareness forged in Desert Storm. And we need to practice it at the CTCs. I'm encouraged by some recent work at the NTC. Both counterfire and target acquisition are beginning to get the attention they deserve. I also see some encouraging changes at the JRTC, such as the participation of key players, for example ANGLICO [air naval gunfire liaison company] teams. We need continued emphasis on getting every player on the combined arms team on the field at the CTCs. Thus, combined arms commanders can train to synchronize the team.

How do you envision the future CTCs' evolving to maintain our Army's warfighting edge?

We've got to ensure our practice fields remain relevant to the circumstances in which the Army finds itself. At one time we trained to fight based on the Cold War world order. Now the playing field has changed, and we've changed our training accordingly.

General Sullivan has directed we conduct contingency operations at both the NTC and JRTC. At the JRTC, you'll see joint operations on a continuing basis and armor-mech, light, and special operating forces. You'll see light and armor-mech forces at the NTC. Units now face the threat in a variety of configurations as opposed to one threat. In our BCTPs [battle command training programs] for our divisions and corps, you'll see the same type of changes occurring. We're shifting quickly to post-Cold War warfighting.

But ***relevancy*** is key. Our training has to be relevant to the circumstances in which the Army finds itself. We must sustain excellence and relevance in training and leader development.

Current doctrine addresses the commander's intent in his concept for fires and maneuver but in general terms. What should fire support and maneuver expect from the combined arms commander?

The commander needs to precisely describe the effects he's trying to achieve and ***where*** and ***when*** he wants them. In simple, straightforward language, he should describe his desired effects in the conduct of the operation, the point of his main effort, a sensing of the speed of the operation, and where it needs to be relatively tightly controlled. And, depending on the echelon, the commander may have to tell where he chooses to fight the decisive battle over time. If he's the corps commander, he's probably describing 2 to 4 days of operations.

But the combined arms commander doesn't come up with his intent in isolation. Before he expresses the intent, either verbally or in the order, there needs to be continual dialogue face-to-face with subordinate commanders and his staff so he can harmonize his operating systems. He gets advice for his running estimate by talking to subordinate commanders, members of his staff, commanders of fire support and engineer units, and so forth. That's the way to make the combined arms orchestra play.

But when the intent arrives, then it's the responsibility of the logistician, fire supporter, engineer, etc., to say, "How can I involve my organization to best achieve the desired effects?" For example, at the division or higher level, the fire support officer should give the commander some alternatives for task organizing the artillery and weighing the effects of fires to achieve his desired outcome.

What impact do you believe future intelligence and fire support systems will have in terms of achieving success on the bat-

tlefield without major engagements of maneuver forces?

Most combined arms commanders would tell you that the major intelligence shortcoming in terms of identifying targets is their inability to see over the hill. What they're trying to avoid is unplanned meeting engagements. Friendly reconnaissance out front, either in the defense or the attack, is of utmost importance to commanders. Our ability to see over the hill will be improved, by and large, by the UAV [unmanned aerial vehicle].

We need the ability to rapidly target and deliver fires that contribute to the overall tactical scheme. For example, in Southwest Asia, we were fortunate to have the Pioneer [UAV]. So we flew it and, with a quick-fire capability, spotted and fired on targets in real time. It's the real-time capability we're looking for in delivering fires—not only with cannons, but also with the Army TACMS and MLRS.

As far as fires substituting for maneuver engagements are concerned, you have to watch how you think about that. Fires and maneuver are linked; one contributes to the other.

Of course, it depends on the type of target you're talking about. With MLRS and Army TACMS, you can achieve lethal effects without involving maneuver forces. For example, if you're firing at a SAM [surface-to-air missile] site with Army TACMS, you can probably put it out of business.

How can the combined arms commander make the most of his fire support and aviation assets?

In the factors of METT-T [mission, enemy, terrain, troops, and time available], he looks for those elements of combat power he can rapidly shift from one part of the battlefield to another. I call those "reusable combat assets." Though the commander can usually shift his artillery the quickest, his reusable combat assets also include aviation and close air support.

So the commander formulates his plan to take advantage of reusable combat power available to him. But a fire plan is just that—a plan. The fire supporter, the aviator, and the Air Force representative must understand the commander will have to deviate from the plan to seize opportunities, and rapidly adjust to take advantage of situations as they occur during the fight.

We've got a great Army, and I'm proud to be part of it.

The Army's capstone warfighting doctrinal Field Manual [FM] 100-5, Operations is under revision. How is this manual changing?

The Chief of Staff of the Army has charged TRADOC with leading the Army through this intellectual change to a post-Cold War world by using doctrine as the engine of change. A part of this effort includes revising FM 100-5. Our doctrine isn't broken. But we need to include in it the operational versatility our Army now requires in a post-Cold War era.

FM 100-5 will describe how to think about mobilization and deployment, how to think about employing Army forces in actions short of war and other intellectual changes we must make—all of which we've done before in some form or other. But the centerpiece of the revised FM 100-5 will continue to be fighting at the tactical, operational, and strategic levels—guidelines for employing forces, conditioned by the factors of METT-T.

We're engaging not only TRADOC, but the total Army in developing FM 100-5. The process is as important as the product. If we do the process right, if we have the kind of dialogue we need, we'll accomplish two things. First, we'll inform the Army about the need for change as we change. And second, by the time we publish the manual sometime in 1993, we'll have tapped the collective wisdom of the Army to include in the revised manual. FM 100-5 is TRADOC's "point of main effort" and requires the full attention of leaders Army-wide.

What message would you send to combined arms soldiers worldwide?

We've got a great Army, and I'm proud to be part of it. It's one that's confident in itself, as proved by its successes in Just Cause, the Cold War, and Desert Storm.

But we have work to do. We must rapidly shift our focus from preparing to fight the battles of a Cold War world to the battles of the future. And to do that in our smaller Army, we must optimize all our combat capabilities, including making the most of our fires. So our doctrine, training, and leader development strategies must evolve as we reshape the Army.

Then, as we reduce forces in Europe, move units to our TRADOC installations and as our Army gets smaller, we must do it all while caring for our soldiers, civilians, and their families. For those who leave the Army, we must show our great appreciation for their service in peace and war, helping to make the Army the best in our nation's history. Every Army alumni should depart with a sense of dignity and respect.

To our many soldiers who will remain in the Army, all of whom play some part on the combined arms team, I thank you for all you've done and challenge you to continue your record of excellence. ❐

Organic Army Aviation in World

This study of Army Aviation in World War II was excerpted from a longer work in progress. Part 2, covering the latter part of the war, will appear in a later issue. The opinions expressed in this article are those of the author and do not necessarily reflect the views of any Department of Defense agency.

BELOW: A "Grasshopper" stopped at a filling station for gas during the Louisiana Maneuvers in 1941. INSET: Captain Joseph M. Watson, Jr. and his L-4 "Mary Ellen," which he flew throughout the Tunisian and Italian campaigns.

photograph by Hans Groenhoff

War II

Part 1
1940-1943

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On 6 June 1942, the secretary of war ordered the establishment of organic air observation for Field Artillery. Through companion memoranda sent to the commanding generals of the Army Air Forces (AAF) and the Army Ground Forces (AGF), the War Department issued specific instructions for organizing organic air observation. It also provided guidelines for relations between the AAF and this new air arm of the AGF.

For example, the air forces were to supply the ground forces with small one-engine planes, called "liaison-type airplanes," and spare parts. The air forces also were responsible for all third echelon aviation maintenance in the Army, basic flight training, and rating the student pilots "according to standards established for liaison pilots."

Organic air observation in Field Artillery was intended not to replace, but rather "to supplement the AAF's responsibility for aerial adjustment of artillery fire" from high-performance aircraft. The order of 6 June authorized two organic aircraft for each artillery battalion and two for each brigade, division, and group artillery headquarters, without affecting existing obligations of the AAF.[1]

The establishment of organic Army Aviation in June 1942 complied with a recommendation from the office of the commanding general of the AGF. This recommendation followed a series of tests and experiments that had demonstrated the efficacy of organic aircraft for Field Artillery units.

The AAF of the World War II (WWII) period had evolved from the 19th century Balloon Corps, the Army Air Service of the WWI era, and the Army Air Corps of the 1920s and 1930s. The history of the U.S. Army's air arm from the Civil War era until 6 June 1942 is the common heritage of both the Aviation Branch of the Army and the U.S. Air Force (USAF).

After the birth of organic Army Aviation in 1942, the evolutionary path of the future Aviation Branch of the Army diverged from that of the future USAF.

During WWII, and until the establishment of the USAF in 1947, however, the large and powerful AAF and the minuscule new air arm of the AGF were both parts of the Army. Even during these early years, they often competed for resources and mission assignments.

The Louisiana Maneuvers

The movement in the AGF that was to result in establishing a new Army air arm began around 1940. Joseph McCord Watson, Jr., a young artillery officer, had been experimenting with the concept of artillery fire adjustment from small aircraft.

In 1940, he requested that the Piper Aircraft Corporation furnish two Piper Cubs to experiment with fire adjustment during Army maneuvers. These experiments, conducted at Camp Beauregard, LA, in August 1940, proved successful notwithstanding the absence of radios in the aircraft.[2]

In the fall of 1940, Major General (MG) Robert M. Danford, the chief of Field Artillery, and other artillery officers became interested in further

testing the organic spotter-plane concept.

They were motivated by two major factors. First, Air Corps planes were not always available to provide artillery spotter support when needed. Secondly, some artillerymen were coming to believe that lightweight aircraft, piloted by artillery officers and dependent on ground commanders, could do a better job.[3] Interest in the concept of using small organic aircraft for fire adjustment became more widespread as a result of an article by Major (MAJ) William W. Ford, "Wings for Santa Barbara." The article was published in the ***Field Artillery Journal*** in April 1941.[4]

Army General Headquarters conducted maneuvers in Louisiana, Tennessee, Texas, and the Carolinas in 1941. Three light aircraft manufacturers, Piper, Taylorcraft, and Aeronca, placed 11 planes at the disposal of the Army during the maneuvers.

These cub-type planes, mostly Piper J-3s, flown by civilian pilots were tested for artillery spotting as well as for courier service and other liaison roles.

During the maneuvers, these 11 "Grasshoppers," as they were named by MG Innis P. Swift, commanding general, 1st Cavalry Division, flew about 400,000 miles in some 3,000 missions.

In comparison to the larger air forces planes, the Grasshoppers cost much less, could take off and land on almost any level surface, and could maintain much more effective contact with the ground units that they supported.

Furthermore, according to General Danford, the "only uniformly satisfactory report of air observation during the maneuvers... [came] from those artillery units where...light commercial planes operated by civilian pilots were used."[5]

After the 1941 maneuvers, General Danford renewed his efforts to obtain War Department permission to conduct formal tests of light aircraft organic to Field Artillery units. On 8 December 1941, the day after the Japanese attack on Pearl Harbor, a War Department memorandum authorized Field Artillery to proceed with the proposed tests and directed the AAF to make 28 YO-59 (Piper J-3 or Piper Cub) aircraft available to Field Artillery as soon as practicable.[6]

With the new liaison "L" classification introduced on 2 April 1942, the YO-59 became the L-4, the aircraft most widely used by organic Army Aviation during WWII. The AGF also used a few L-2 Taylorcraft and L-3 Aeroncas, but they were far less satisfactory.[7]

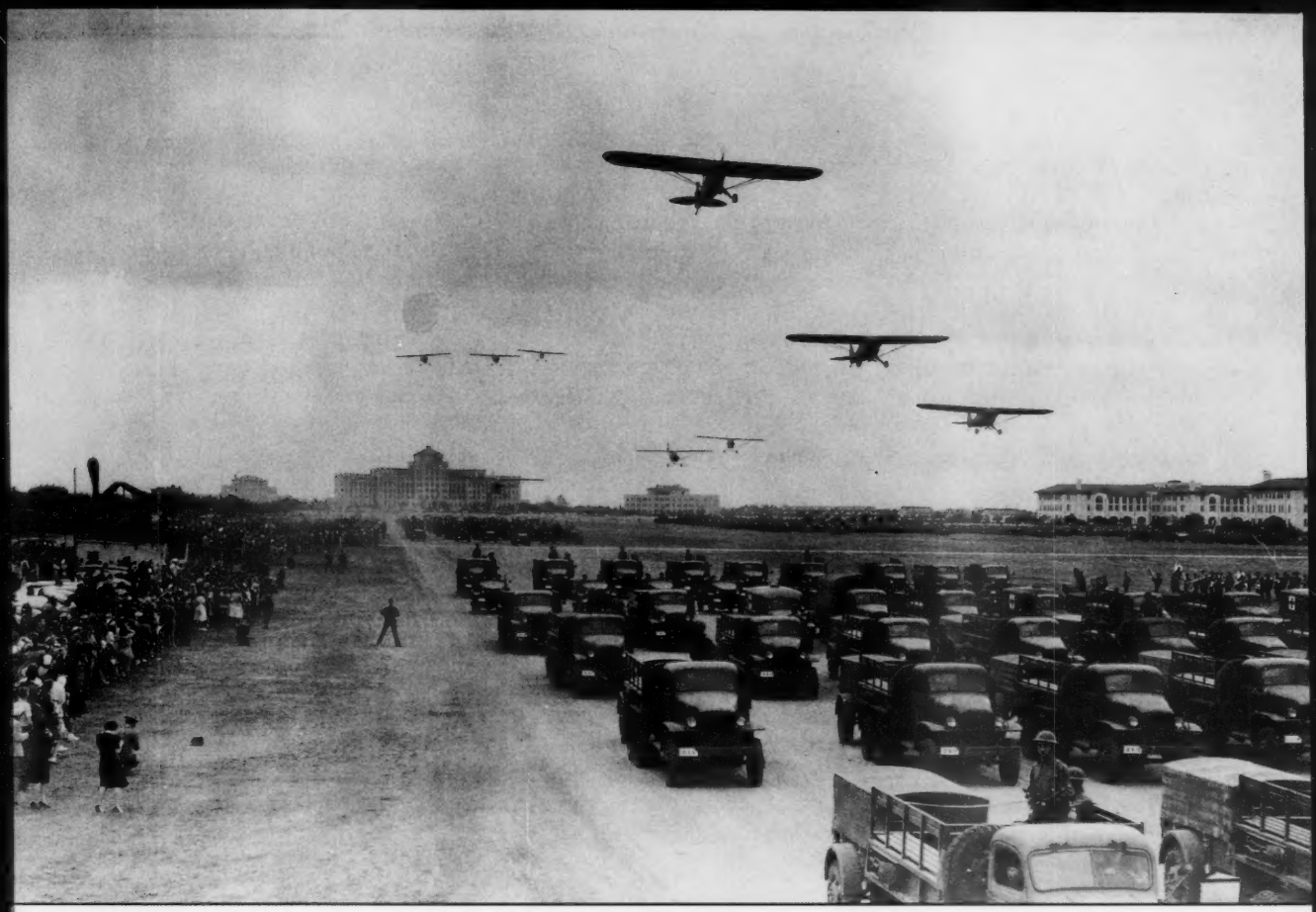
Colonel William W. Ford (left), was the first director of the Department of Air Training at Fort Sill, Oklahoma, in 1942, and Lieutenant Colonel Gordon J. Wolf was the first deputy director.

The Class Before One

On 2 January 1942, Lieutenant Colonel (LTC) William W. Ford became director of air training at Fort Sill, OK, for the purpose of training a group of licensed pilots in the techniques of aerial artillery spotting from small aircraft. Ford selected MAJ Gordon J. Wolf, a Field Artillery reservist, as his executive officer.

First Lieutenant (1LT) Robert R. Williams and 2LT Delbert L. Bristol assisted Ford and Wolf in setting up the program. Nine civilian flight instructors also joined the team.

Training began on 15 January at Fort Sill's Post Field with 24 Piper Cub J-3 airplanes furnished by the AAF. The students, who have come to be known as the "Class Before One," consisted of both officers and enlisted men. At Fort Sill, they were trained in both tactical flying and airplane maintenance. For artillery spotting, they had to learn to fly low and slow: low in order to avoid hostile aircraft and slow in order to land



Flight B of the Class Before One passes in review at Fort Sam Houston, Texas in April 1942.

on the shortest possible landing strip.

Upon completion of the training on 28 February, the detachment was divided into two groups for the tests.

Flight A consisted of six officers and eight enlisted men. It was sent to Fort Bragg, NC, and then to Camp Blanding, FL, for tests with the 13th Field Artillery Brigade.

Flight B consisted of Major Wolf, six other officers, and seven enlisted men. It was sent to Fort Sam Houston, TX, for tests with the 2d Infantry Division artillery. LTC Ford divided his time between the two groups.[8]

In the tests, the Piper Cubs operated by artillery officers performed fully as well as their advocates expected. Several advantages of the light aircraft were clearly demonstrated. Piper Cubs were easy to operate and maintain; they could be easily dismantled for ground movement; and they could take off from and land on unimproved strips.

The tests also demonstrated the effectiveness of close contact between pilots and ground commanders and of providing maintenance training to pilots. The validity of the organic-light aircraft concept was proven.

The tests were completed in late April of 1942. At that time, Brigadier General Mark Clark, chief of staff to the commander of the AGF, Lieutenant General Lesley J. McNair, approved the test reports and recommended the establishment of organic air observation for Field Artillery.[9] The memoranda of 6 June 1942 resulted from this recommendation.

Training

The Department of Air Training was established in the Field Artillery School at Fort Sill a few days after the War Department memoranda of 6 June. The original training staff consisted of most of the people involved in the test group, including LTC Ford and MAJ Wolfe, who continued as director and executive officer, respectively. The first tactical flight train-

ing class, "Class One," began in early August, 1942.

Maintenance was an important part of organic Army Aviation training from the beginning. The first class for mechanics began in July 1942. LT Marion J. Fortner, an aeronautical engineer and a member of the Class Before One, was primarily responsible for the development of maintenance courses for both pilots and mechanics.

Initially, all tactical flight training students already had civilian pilot licenses. As the supply of licensed pilots ran out, the AAF, which had responsibility for providing rated pilots to the AGF, contracted with civilian companies to conduct primary flight instruction.

The primary training phase consisted of around 9 weeks of liaison pilot training at Pittsburg, KS, and Denton, TX. After primary flight instruction, the new pilots received from 5 to 10 weeks of advanced tactical training in the Department of Air Training at Fort Sill. [10]

Army Air Forces and Army Ground Forces Rivalry

Rivalry between the AAF and the AGF over organic aviation had surfaced in 1940, when the ground forces began testing the concept. Friction between the two major Army commands became more pronounced during the latter half of 1942. One aspect of the dispute concerned the selection, training, and rating of pilots.

Field Artillery preferred that its "pilot-observers" be officers, branch-trained artillery officers insofar as possible. On the other hand, all AAF liaison pilots were noncommissioned officers (NCOs). War Department leaders originally expected that most of the Field Artillery pilots would be NCOs also. Furthermore, the AAF believed that the liaison pilot should be trained only to operate light aircraft and that the "passenger-observer," who need not be a pilot, should be responsible for fire adjustment.

Most of the licensed volunteers who completed the tactical training course during the early months of the program were officers. When the AAF began training and rating pilots to send to Fort Sill in September 1942, the air forces selected and trained enlisted men according to their policy regarding the rank of liaison pilots.

Since the AAF had already combed the Army for aviation volunteers, however, it was difficult to find qualified persons willing to serve as enlisted pilots. All trainees of the first group sent to Fort Sill, for example, consisted of rejected aviation cadets.

The instructors at Fort Sill found many of the men selected, trained, and rated as liaison pilots by the AAF to be inadequately trained, or otherwise unqualified, when they arrived for advanced tactical training.

Conversely, the air forces, with exclusive authority to rate Army pilots, challenged the qualifications of some of the licensed pilots admitted to the advanced course at Fort Sill without having received training under the auspices of the AAF. The commandant of the Field Artillery School reported, on 28 September 1942, that the procedures for the selection, training, and rating of pilots were "chaotic." He proposed that the ground forces be given exclusive responsibility for these functions.

The assistant secretary of war called a series of meetings of high-level AAF and AGF representatives in response to reports of personnel selection and pilot rating problems in organic Army Aviation. Compromise agreements were reached in late 1942 and early 1943. Field Artillery won on two points and lost on two others.

First, the "pilot-observer" concept was accepted; the pilot-observers were to be officers trained to adjust artillery fire. The pilot-observer of each aircraft was to be accompanied by a radioman-mechanic, who also helped watch for hostile planes and assisted in fire adjustment.

Second, the AGF gained responsibility for and control over the selection of volunteers for the organic aviation program. The AAF, however, retained responsibility for providing primary flight training and for conferring pilot ratings.[11]

Most of the enlisted men rated as liaison pilots before April 1943 were subsequently commissioned. It should be noted, however, that some NCOs remained in organic Army Aviation and performed creditable service in all major theaters throughout the war.[12]

The conflict between the AAF and the AGF erupted on another issue in late 1942. General McNair had been lukewarm toward organic aviation in Field Artillery when it was established. However, he became a staunch supporter before the end of the year. He accordingly proposed, on 16 November, that the program be extended to other branches of the ground forces.

MG George E. Stratemeyer, Chief of the Air Staff, responded 3 days later with a counterproposal that all Field Artillery aviation be discontinued and replaced by air forces liaison flights. All AGF aviation personnel and planes were to be transferred to these AAF liaison flights, which would be assigned to each army, corps, and division to support the ground commanders.[13]

Organic Army Aviation was already coming to be recognized as an excellent solution to the problem of aerial fire adjustment. Since the AAF observation squadrons continued to fail to provide reliable artillery support, the General Stratemeyer's proposal was not given serious consideration.

General McNair's proposal, however, in effect called for the acquisition of more liaison-type planes than would have become available for all the armed services during 1943.[14] Therefore, the War Department rejected it. Although organic ground

force aviation continued to expand gradually, its official mission did not change until 1945.

These AAF-AGF conflicts during the infancy of organic Army Aviation were harbingers of a rivalry that would continue for more than three decades. The very existence of a second Army air arm, albeit minuscule in comparison to the AAF, constituted a constant temptation for the AGF (later the Army) to expand it; it also created a potential rival for the AAF (later the USAF) to either absorb or destroy.

Combat: Mediterranean Theater of Operations

Organic Army Aviation first entered combat in North Africa in late 1942. On 9 November, four Army liaison pilots flew three L-4s from the deck of the USS Ranger, a carrier participating in the invasion of North Africa.

Since the captain of the Ranger refused to break radio silence to announce the presence of these Piper Cubs—unusual aircraft to be seen at sea during an invasion—they were fired upon by American ships and shore batteries. The plane flown by the squadron leader, Captain (CPT) Ford E. Allcorn, was hit and crash landed on shore, but all of the pilots survived.

Before the end of November, several other L-4s and Army aviators arrived in North Africa, where they were assigned to armored and infantry divisions. LT Paul A. Dewitt was reported to be the first Army aviator to fly a Grasshopper in an artillery mission in combat.[15]

During the North African campaign, there were not enough aircraft and pilots for all artillery units. A program for training additional pilot-observers in North Africa encountered bureaucratic hurdles and achieved only limited success.

With the aircraft available to them in North Africa, the pilot-observers learned several valuable lessons that they passed back to the Department of Air Training at Fort Sill. These included staying airborne much longer than had been intended, flying at dusk to locate enemy artillery positions more effectively, and nighttime flying.

As early as the North African campaign, the exigencies of war and the availability of the organic aircraft caused them to be used for purposes other than artillery fire adjustment. These other uses included command and control, medical evacuation, and aerial photography.[16]

The obvious value of the L-4s in these missions fomented the AGF effort to expand organic aviation to other Army branches in 1943.

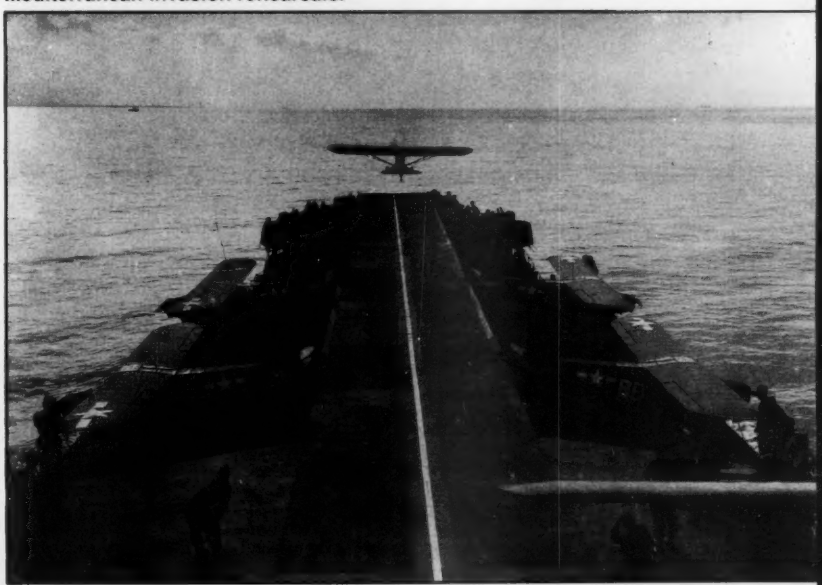
With more planes and pilot-observers available, the role of organic Army Aviation expanded as the allies moved from North Africa to Sicily. During the landings on Sicily, CPT Brenton Devol, Jr., who had flown one of the first L-4s off the U.S. Ranger, constructed a flight deck on a landing ship transport (LST).

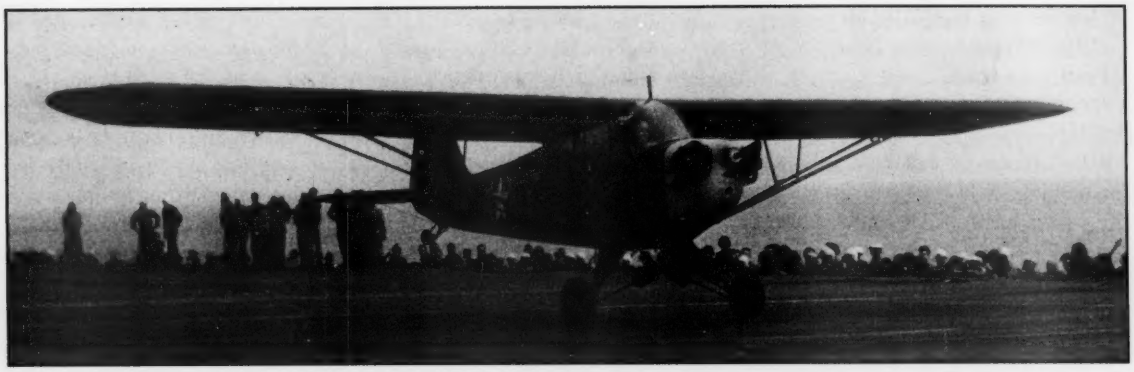
Later at Anzio, in the Italian campaign, L-4s took off from the decks of LSTs and participated in combat. Nighttime artillery fire adjustment became common during the Italian campaign. Since the L-4 had no built-in navigational instruments and no panel lights, however, night flying was a problem; hand-held flashlights were sometimes used. Army aviators who made significant contributions to the development of techniques for artillery fire adjustment at night included O. Glenn Goodhand (later a brigadier general) and Delbert Bristol (later a colonel).[17]

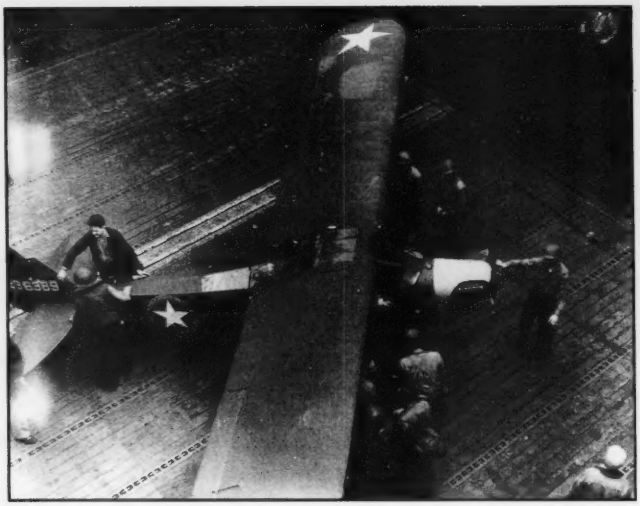
Additional missions performed by organic Army Aviation during the Italian campaign consisted of adjustment of offshore naval gunfire, laying wire, emergency light transport, courier service, aerial photography, and reconnaissance.

In northern Italy, and later in southern France and in other theaters, AGF

An L-4 takes off from the improvised deck of an LST during Mediterranean invasion rehearsals.







TOP: Captain Ford Allcorn flies his L-4 Cub from the USS Ranger during the invasion of North Africa in 1942.
LEFT: An L-4 on the hangar deck of the USS Ranger.
ABOVE: Lieutenant William Butler (front seat) and Captain Brent Devol prepare to takeoff.

planes were also used in so-called "Horsefly" missions. These missions assisted high-performance fighters and bombers in locating close-in targets on which Army ground units desired air strikes.[18] One of the pioneers in planning and conducting Horsefly operations was MAJ John Oswalt.[19]

Organic Army Aviation and the L-4

The aerial adjustment of artillery fire was both the purpose for the establishment of organic Army Aviation and its single most important function during WWII. After it came to be accepted by artillery commanders, organic aviation was a complete success in this mission.

The AAF observation squadrons, which were to have shared responsibility for artillery fire adjustment, proved unworkable in combat, and virtually all aerial artillery fire adjustment was provided by organic aviation.[20]

That the 65 horsepower L-4s were effective in artillery fire adjustment and that they had several advantages over AAF aircraft had been amply demonstrated before they first entered combat. However, many observers still doubted that L-4s could survive in a hostile environment. As it turned out, they were very survivable.

Their defense against enemy fighters, when the allies did not have command of the skies, was to roll over and dive toward allied anti-aircraft batteries, which would then open fire on the pursuing enemy aircraft. Their defense against enemy ground fire was their radio, with which they could direct artillery fire on the enemy battery.

The result was that, when the L-4s were in the air over enemy lines, enemy aircraft tended to stay away, and enemy anti-aircraft batteries tended to hide.[21] In many cases, in

fact, an L-4 was kept in the air during daylight hours for its counterbattery effect—not only on enemy artillery but also on antiaircraft batteries.[22]

The L-4 was an excellent aircraft for daytime adjustment of artillery fire, as well as for many other uses. Major advantages included its maneuverability and the small space requirement for take-off and landing. Shortcomings of the L-4 included its lack of panel lights, its limited range and speed, and its inability to operate at high altitudes in mountainous terrain.

Two other problems were the danger of loss of life from fire when crash landing (because of the location of the fuel tank) and the difficulty of using a parachute (because of space and weight limitations).[23] Other disadvantages of the L-4 were related to its being used for unintended purposes.

In the absence of the required air forces liaison air support, L-4s came to be used for many missions for which larger and better equipped aircraft were needed. Because of these requirements, the AGF requested and eventually acquired larger aircraft to supplement the L-4s.

NOTES

1. Memos, WDGCT 320.2 (2-5-42), B G. I. H. Edwards for commanding generals of the Army Air Forces and Army Ground Forces, 6 June 1942, subj: organic air observation for field artillery, Aviation Branch Command Historian Office files (hereinafter referred to as ABCHO). See also Kent Roberts Greenfield, ***Army Ground Forces and the Air-Ground Battle Team Including Organic Light Aviation*** (Study No. 35, Historical Section, Army Ground Forces, 1948), pp. 23-25.

2. Laurence B. Epstein, "Army Organic Light Aviation: The Founding Fathers," ***U.S. Army Aviation Digest*** XXIII, 6 (June 1977), pp. 2-17.

3. Boyd L. Dastrup, ***King of Battle: A Branch History of the U.S. Army's Field Artillery*** (Fort Monroe, VA: U.S. Army Training and Doctrine Command, 1992), pp. 206-207.

4. ***Field Artillery Journal***, Vol. XXXI, No. 4, pp. 232-34. Santa Barbara is regarded as the patron saint of artillerymen.

5. Written by General Danford in a memo of 28 Oct 41 to CSofA, cited by Greenfield, ***Army Ground Forces***, p. 23. See also Christopher R. Gabel, ***The U.S. Army GHQ Maneuvers of 1941*** (Washington: Center of Military History, 1991), pp. 180-82; Robert F. Futrell, "Control of Observation Aviation: A Study of Tactical Air Power," (Unpublished manuscript, U.S. Air Force Historical Study No. 24, Air University), p. 40.

6. Memo G-3 42989, BG Twaddle, ACofS, for TAG, 8 Dec 41, ABCHO; William W. Ford, ***Wagon Soldier*** (West Redding, CT: privately printed), p. 120; Epstein, "Army Organic Light Aviation," pp. 15-17.

7. See Futrell, "Control of Observation Aviation," p. 41, passim; Ken Wakefield and Wesley Kyle, ***The Fighting Grasshoppers: U.S. Liaison Aircraft Operations in Europe, 1942-1945*** (Leicester, England: Midland Counties Publications, c. 1990), p. 21.

8. This summary is based on accounts in Ford, ***Wagon Soldier***, pp. 122-26 and 161-63; Richard Tierney and Fred Montgomery, ***The Army Aviation Story*** (Northport, AL: Colonial Press), pp. 56-61; and Wakefield and Kyle, The Fighting Grasshoppers, p. 17.

9. William W. Ford, "Forty Years of Army Aviation: Part I, Grasshoppers," ***U.S. Army Aviation Digest*** XXVIII, 6 (June 1982), pp. 2-10; Lowell M. Riley and Angus Rutledge, "Organic Air Observation for Field Artillery," ***Field Artillery Journal***, XXXII, 7 (July 1942), pp. 498-501.

10. Ford, Wagon Soldier, pp. 127-29; Tierney and Montgomery, ***The Army Aviation Story***, pp. 65-79.

11. The best account of this dispute and of the compromise agreement is in Greenfield, ***The Army Ground Forces***, pp. 25-26 and 57-58. See also Futrell, "Control of Observation Aviation," pp. 44-45.

12. See Wakefield and Kyle, ***The Fighting Grasshoppers***, pp. 73, 76, passim; Transcript of Interview with LTG Robert R. Williams (ret), conducted by Ralph J. Powell and Philip E. Courts, 1978, p. 15.

13. Memo, George E. Stratemeyer for CofS, 19 Nov 42, subj: organic liaison aviation for ground units, ABCHO; Greenfield, ***The Army Ground Forces***, pp. 26-28.

14 . Greenfield, ***Army Ground Forces***, pp. 58-59.

15. Tierney and Montgomery, ***The Army Aviation Story***, pp. 119-26; Wakefield and Kyle, **The Fighting Grasshoppers**, p. 31.

16. Tierney and Montgomery, ***The Army Aviation Story***, pp. 125-33; Herbert P. LePore, "Eyes in the Sky: A History of Liaison Aircraft and Their Use in World War II," ***Army History*** PB-20-91-1, No. 17 (Winter 1990-1991), pp. 33-34.

17. Transcript of interview with COL Delbert Bristol (ret), conducted by Ralph J. Powell and Ronald K. Andreson, 1978, pp. 10-12; Biographical sketch of BG O. Glenn Goodhand, ABCHO.

18. The General Board, United States Forces, European Theater, "Liaison Aircraft with Ground Force Units," (unpublished study, 1945), ABCHO.

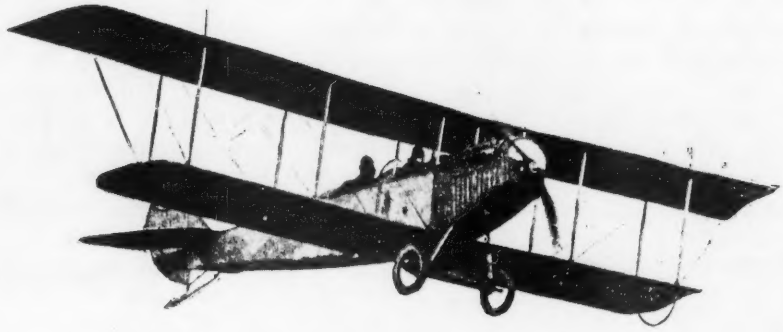
19. Wakefield and Kyle, ***The Fighting Grasshoppers***, pp. 79 and 118.

20. See "Williams Interview, pp. 7, 9, 25; Greenfield, ***Army Ground Forces***, p. 60; and LePore, "Eyes in the Sky," p. 35.

21. "Williams interview," pp. 23-24.

22. Greenfield, ***Army Ground Forces***, p. 97.

23. See "Bristol Interview," pp. 18, passim; Ltr, LTG Gen. Robert R. Williams (ret) to author, March 1992, ABCHO.



Aviation, cavalry, infantry, and artillery all worked and trained together at Fort Sill, OK, in early years of this century. Each branch grew and developed its own distinct missions. The Army Aviation School moved to Fort Rucker, AL, in 1954.

Henry Post Army Airfield

First Home of Army Aviation

Ms. Jean Schucker
Assistant Editor
The Cannoneer
Fort Sill, OK

From the earliest days of cloth and wooden biplanes to today's unique mission to train noncommissioned officer helicopter pilots to serve as forward observers, the history of Henry Post Army Airfield, Fort Sill, OK, is rich with adventure, invention, and challenge.

During the early years of the 20th century, cavalry, infantry, and artillery troops all worked and trained together at Fort Sill. The separate branches grew and developed their own distinct missions. The cavalry left the post in 1907. The School of Fire for the Field Artillery was established in 1911. When the infantry left for Fort Benning, GA, in 1917, the Field Artillery, a separate Army branch, inherited the post.

Army Aviation history began at Fort Sill on 28 July 1915, with the arrival of the 1st Aero Squadron. (In 1954, the Army Aviation School moved to Fort Rucker, AL.) The squadron's mission was to conduct experiments observing artillery fire from airplanes. Pilots also performed experiments in aerial photography using a Brock automatic camera to make the first aerial mosaic map.

The squadron's Curtiss JN-3 aircraft, known as "Flying Jennys," began the first cross-country flight of the

Courtesy of Army Aviation Museum, Fort Rucker Alabama

(Courtesy of Fort Sill Museum)

ABOVE: Curtiss JN-4D "Flying Jennies" were used at Fort Sill from 1918 to 1922. An earlier model, the JN-3 was used by the Aero Squadron, the first air unit in the U.S. military service. These aircraft arrived at Fort Sill in 1915.

LEFT: Aerial observers prepare for a photographic mission with the Brock camera.

fledgling air service when it took off from Fort Sill 19 November 1915, for Fort Sam Houston, TX, flying 439 miles in 2 days.

The 1st Aero Squadron became the first U.S. tactical air unit in the field when it began operations with General John Pershing's expedition into Mexico. Although the pilots were stationed on the border, their orders still came from Fort Sill. After duty with Pershing's expedition, they went on to France in 1917 to participate in the war—again acting as aerial observers. Henry Post Army Airfield was officially designated in 1917 after Second Lieutenant Henry Post, an aviator who died in California in 1914 trying to establish a world altitude record.

After World War I (WWI), the airfield continued as a center for all types of aviation activities. With the importance of aircraft in general and tactical aerial observation for the field artillery established during the war, the entire Midwest became a hotbed of military and civilian aviation experimentation.

The joys of flying captured the nation's interest and enthusiasm. Almost every town boasted a pilot or two who flew in and out of cow pastures, dirt roads, and just about any level spot they could find. Henry Post Field became one of the frequently visited stops for rich and influential flyboys to drop in for a polo game or to refuel for cross-country flights.

In January 1918, the School for Aerial Observers, which included balloons and fixed-wing aircraft, opened at the airfield. Hanger and landing strip construction began in August of that year. Although the hangers are long-gone, some tie-downs for fixed-wing aircraft and balloons remain.

Balloons used for aerial observation came into their own during this period. The concept was not new—both

Henry Post Army Airfield

armies used balloons during the Civil War for adjusting artillery fire. But now, Fort Sill became the home of experimentation for this method of aerial observation.

Observers went aloft in two types of balloons. "Free" balloons, which flew from the airfield, were restricted to flying within a 50-mile radius of the post. "Captured" balloons, towed to the ranges by trucks, carried two to four people and flew as high as 8,000 feet.

Aerial observation from hydrogen-filled balloons was a risky business. Sometimes balloons and their pilots and aerial observers were scattered as far away as Mexico, depending on the prevailing winds. Fire and explosions contributed to losses of men and equipment.

In fact, fire was an ever-present danger to flight crews and ground crews. The wooden hangers fell prey to arson during the early 1930s. It was not until the culprits were caught and sent to jail at Fort Leavenworth, KS, that the Department of the Army approved funding for new construction at Fort Sill. The huge metal hanger, which exists at the airfield today, was part of the post-wide building boom of 1934 and 1935.

Shortly afterwards, balloons lost their popularity as a mode of aerial artillery observation and fixed-wing aircraft came into their own. L-4s, the military version of the Piper Cub, became the most widely-used aircraft by organic Army Aviation.

With the bombing of Pearl Harbor in December 1941, military activity picked up at Henry Post Army Airfield. With it, a new method began by using airplanes in field artillery fire.

Lieutenant Colonel William Ford, a field artilleryman and private pilot, sold the Army on training pilots in the new concept of organic aviation in field artillery. This idea meant each battalion would have its own aerial observer pilot, or "spotter," equipped with a light airplane. Both would "live" with the battalion.

The little planes, dubbed "grasshoppers," could take off and land on dirt roads and in cow pastures. The pilot-observer could dash into the air when a call for fire came, quickly observe and adjust fire, and land again, thus avoiding the usual long wait for aerial observer support experienced during WWI.

In January 1942, an experimental group of civilian pilots and field artillerymen became the "Class Before One." Ford drafted field artillery officers, enlisted men, and reserve pilots who held a pilot's license.

The test group didn't have the luxury of time to go through basic flight training. Time was of the essence. The class trained as pilots, aerial observers, and mechanics—each man servicing his own plane while stationed with his battalion.

After brief initial training from 15 January to 28 February 1942, the pilots flew to Fort Bragg, NC, and Fort Sam Houston to perform field tests with field artillery units. The tests were a success.

BELOW: Henry Post Army Airfield in 1929
TOP RIGHT: L-4s, the military version of the Piper Cub, became the most widely-used aircraft for organic Army Aviation, nicknamed the grasshoppers.

On 6 June 1942, the War Department officially established organic air observation for Field Artillery. Each battalion was authorized two airplanes, two pilots, and one mechanic.

Ford was promoted to colonel and became commander of the new Department of Air Training at Fort Sill. Nineteen students entered the first class during the beginning of WWII in August 1942. By the end of WWII, 262 pilots and 2,262 mechanics had completed training at Fort Sill.

Ninety percent of all artillery fire missions in the Pacific was directed by air observation.

Students learned everything from water landings and takeoffs at nearby Lake Lawtonka to landing with Brodie gear, a wire-and-pulley device suspended high above the ground that hooked aircraft in midair. The curriculum was designed to meet with every conceivable takeoff and landing possibility when the pilots went overseas to war.

Army Aviation proved its success in WWII and was made organic to all combat branches of the Army. In 1945, the Army Ground Forces Air Training School, later designated the Army Aviation School, was established at Fort Sill. In 1948, H-25 and H-13 helicopter training began and the first warrant officer class started training in 1951. Continued expansion and support of Army Aviation caused the aviation school to outgrow its birthplace at Fort Sill and move to Fort Rucker in 1954.

During the intervening years, Henry Post Army Airfield has continued to serve the Army and the civilian community with test projects for the Field Artillery Board, helicopter testing, and search and rescue missions.

Today, the airfield continues its varied missions. The Directorate of Plans, Training, and Mobilization, Aviation Division, provides a safe environment for Army aircraft to arrive, depart, house, and maintain planes and equipment. The 2d Platoon, A Company, 158th Aviation Regiment—a platoon of CH-47 Chinook helicopters, provides training and transportation for the field artillery and aviation missions. The 4th Platoon, 507th Medical Company (air ambulance), performs rescue missions for the military and civilian communities. Army reservists and National Guard aviators use the airfield for flight-simulator and other training.

Henry Post Army Airfield also will serve as one of 16 hub airfields for fixed-wing aircraft. The new system, scheduled for completion this year, will centralize fixed-wing flights and reduce costs Armywide.

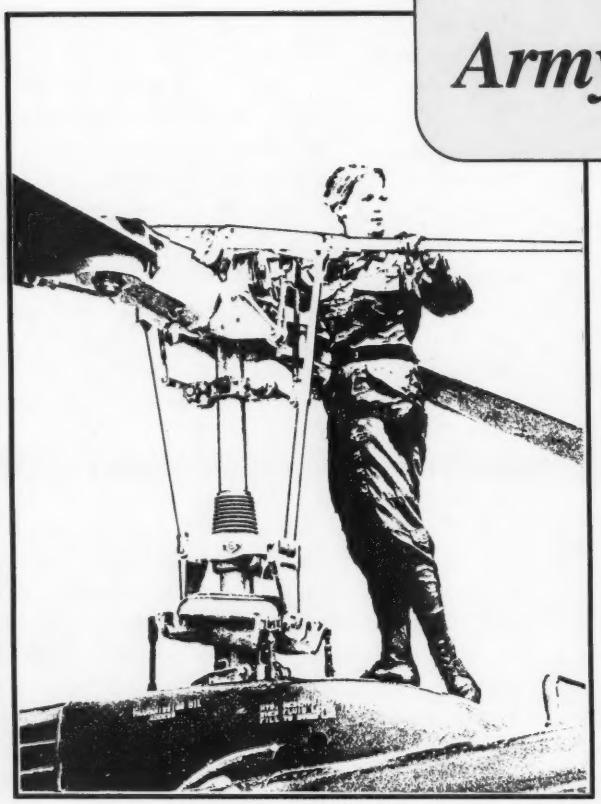
The airfield also continues the tradition of training aerial observers with the Air Forward Observer School. This unique course, run by the Fire Support and Combined Arms Operations Department of the Field Artillery School, trains staff sergeants and sergeants first class in the 13 Foxtrot military occupational specialty.

A prerequisite is at least 10 years' experience in field artillery. Students spend the first 9 weeks of the course learning to fly OH-58 Kiowas at Fort Rucker, then 3 weeks at Fort Sill to learn aerial observer tactics. They fly five missions—three reconnaisance missions and two security missions—calling for and directing artillery fire with the Digital Communications Terminal.

After the 13 Foxtrot students complete the course at Fort Sill, they are sent either to a target acquisition reconnaissance platoon to support an aviation brigade for a heavy division or a similar platoon to support a corps aviation brigade.

Mrs. Susanna Bartee
Army Family Member
Illesheim, Germany

Women in Army Aviation



Lieutenant Sally Murphy, who graduated from flight school at Fort Rucker, AL, in 1974 as the first female Army pilot, is commanding a battalion in Zama, Japan. She left the door open for other women to follow. Today, because of women like her, the Army has about 338 female pilots, more than any other Armed Service.

A mother and her two small daughters are playing outside on a beautiful spring-like day at Fort Rucker, AL, the home of Army Aviation. As a helicopter flies over, the mother shades her eyes from the sun as she looks up and thinks for a moment that she could be flying instead of enjoying her children in the backyard. When she looks back down at her family, she smiles—*never* regretting her decision to leave the Army at the peak of her career.

Less than a mile away at the U.S. Army Aviation Warfighting Center, a female sits diligently typing at a computer terminal. She's working on an article for the ***Aviation Digest*** about a woman's perspective of the Army in general and aviation in particular."My goal," she says, "is to see all positions in the Army open to

women." The next step to seeing that happen, she explains, is allowing women to fly the AH-64 Apache and other combat helicopters.

On another day at Fort Rucker, a beautiful bride makes her way down the aisle of the chapel on the arm of her father, a full bird colonel and deputy assistant commandant, Aviation Warfighting Center. Once at the front of the church, she clasps hands with her husband-to-be, a second lieutenant just finishing flight school. Even though she is in a white dress today, after the honeymoon she will travel with her husband to Fort Bragg, NC, where she, too, will put on a uniform. She will go to her job as a lieutenant flying CH-47 Chinook helicopters.

And in Houston, TX, a female captain works patiently at the National Aeronautics and Space Administration (NASA). She waits for her name to appear on a list of astronauts who will ride the space shuttle next year.

These are four different women with four different career goals. They have in common a love of flying and leadership the Army offers its officers. Each respects the role female soldiers have played and will continue to play in today's Army. As in any other career field, categorizing women in Army aviation is impossible. Women, like men, enlist or are commissioned into the Army for scores of different reasons. The twists and turns their career paths take are just as varied.

From balloon-piloting women in the early 1800s, to the autumn day in 1910 when Blanche Stuart Scott became the first woman in the United States to solo in a heavier-than-air aircraft, and to modern day astronaut Sally Ride, women have heeded the call to fly.

Women have had the opportunity to fly in the Army since the mid-1970s. The World War II Women's Army Auxiliary Corps did participate in some aviation roles, such as aircraft mechanics and radio operators. However, a 1946 study by The Adjutant General's Office concluded only 65 percent of all military occupation specialties (MOSs) could be performed by women—excluding piloting aircraft.

Some women did fly in the 1940s with the Women's Flying Training Detachment and the Women's Auxiliary Ferry Squadron. These organizations later fused together to form the Women's Air Force Service Pilots (WASPs). The catch was these women were still technically civilians, unlike their Women's Army Corps (WAC) counterparts. However, the pride of flying far outweighed the pride of military rank for these women.

In spite of Eleanor Roosevelt's staunch support, Congress gave orders to demobilize the WASPs in December 1944. The 1,074 WASPs had flown more than 60 million miles in almost every kind of military aircraft.

When the Women's Armed Services Act of 1948 was signed into law by President Harry Truman, the U.S. Navy and U.S. Air Force opened some aviation roles to women, although no pilot slots were made available. However, the Army reduced the number of aviation specialties open to women.

Today, there are about 338 female pilots in the Army—more than in any other armed service. They proudly fly both fixed-wing aircraft and helicopters in every type of military situation except combat.

Though the Navy and Air Force are required by law to keep their women out of combat roles, the Army devises its own policy, closely following Congress's order to the other services.The Army's Direct Combat Position Coding System classifies each position in the Army according to the risk it poses of direct combat. That means, although women may be assigned to units that might see enemy fire during a conflict, they are not assigned to positions that guarantee enemy contact—positions such as piloting an Apache or AH-1 Cobra attack helicopter or an OH-58 Scout.

Change may be imminent with the Commission on the Assignment of Women in the Armed Forces meeting in Washington, DC. This commission will study the exclusion of female soldiers from combat aviation. The commission is scheduled to deliver its report to the President in November 1992.

It wasn't until 1974 that the doors opened for a female Army pilot—and it was then Second Lieutenant (2LT) Sally Murphy who walked right through to graduate as the first female pilot. Murphy graduated from flight school with 24 male classmates in class 74-14 at Fort Rucker. She stressed that her colleagues were quite accepting."I was allowed to maintain my femininity, but the men did not pamper me or give me special treatment," she said. "They maintained a perfect balance in our relationship."

Murphy is now a lieutenant colonel commanding a provisional battalion in Zama, Japan. Her name comes up often during speculation about who will be the first female commander of a regular battalion. There is no question she left the door open behind her for many women to follow in her footsteps.

Until then, female soldiers will continue pushing to see the last barrier fall. One example is Major (MAJ) Deborah Ridout, special assistant to the deputy assistant commandant (U.S. Army Reserve), Army Warfighting Center, Fort Rucker.

"I agree with Congresswoman Pat Schroeder of Colorado that women have been studied to death," says MAJ Ridout, "if the Army would open combat aviation roles to women, it could lead the Department of Defense into the 21st century."

Right now, women are allowed to transition into the AH-1 helicopter. A total of only four female soldiers

In 1974, 2LT Sally Woolfolk (now LTC Sally Murphy) was the first female graduated from flight school.

In 1980, 2LT Marcella A. Hayes was the first black female aviator in the armed forces.

have ever been qualified in the Cobra, but have served only as maintenance officers. They are not allowed to fly their aircraft into combat.Though MAJ Ridout says she is eager to see a female train to fly the Apache, she does not envy that person. For men in the Army, the major says, combat roles are the "last male bastion." They don't look forward to seeing women coming to join them on the front lines. It won't be easy for the first woman, she says.

MAJ Ridout knows from experience what it feels like to be a pioneer. She became the first UH-1 instructor pilot in the U.S. Army in April 1978; first female executive officer of an assault helicopter company; and first woman to join every unit in which she has been a part. She says after 16 years her flying ability is still occasionally questioned by new commanders, especially those who have never served with another female.

MAJ Ridout seems to think the ideas that have always kept women out of combat are considered outdated by the majority of society. It is not the general population that believes women are not qualified for combat, according to her. She says it is the very senior leaders who are hesitant to lift the combat exclusion policy.

These men are genuinely concerned, not only about the effectiveness of a gender-integrated combat unit, but also about the welfare of the female soldier, MAJ Ridout believes. She says, "Now, women are getting impatient." Female aviators want to be afforded the same opportunity as male aviators to defend their country, both during peacetime and in war. The challenge, then, is to convince these leaders to give women the same opportunities, she says. "Yes, we may be held by a glass ceiling, but glass will shatter."

Today, women comprise more than 11 percent of the active Army and 4.7 percent of the Aviation Branch. The Army Reserve is more than 20 percent female, and 7 percent of the soldiers in the Army National Guard are women. Those numbers have more than doubled in the last 15 years. Since 1988, more than 11,000 positions have been reevaluated and opened to women. While 90 percent of all Army MOSs have become available to women, only 51 percent of the military jobs are open. In the Aviation Branch, 42 percent of the MOSs are open to female officers.

"Women aviators welcome the opening of positions to them; however, most are concerned about which positions remain closed. Currently, a number of those positions are viewed as 'key positions' on the path to becoming a general officer. Keeping positions closed restricts career opportunities and understandably discourages some

women from continuing service," MAJ Ridout says.

Perhaps the biggest reason for keeping women out of combat roles, many agree, is the fear of more women coming home in body bags. The nation experienced the horror of soldiers—both male and female—killed in action during the recent Operations Desert Shield and Desert Storm, MAJ Ridout says. There was no more mourning for the 11 female soldiers than for the men who died during the deployment, she continues.

More than 26,000 female soldiers were deployed to Saudi Arabia—making up 8.6 percent of the total force. Five women were killed in action, 21 wounded, and two taken prisoner. In nonbattle accidents, 6 women were killed and 16 injured. "Tragedy knows no gender," MAJ Ridout says."Every female aviator I know thoroughly enjoys flying, but more important, each has made a deep personal commitment to the Army—a commitment that includes serving in combat."

Captain (CPT) Nancy Sherlock, the astronaut-in-waiting, also knows what it's like to feel alone as a woman in the Army forging new paths. After graduating from flight school in 1982, she also became a UH-1 Huey instructor pilot and later a standardization pilot for the Aviation Training Brigade at Fort Rucker. She is now an Army astronaut for NASA, Houston, TX.

"Determination is the key to making it," CPT Sherlock says. "The ability not to be considered a Lone Ranger is important. Whether the goal of a young female pilot is to fly in combat or soar in space, knowing her stuff is what counts. Be as technically competent as possible," the captain advises, "and set high goals."

At one point, she remembers some senior male warrant officers who had far more experience than she trying to stump her with lots of questions. She says she had studied enough that she was confident and soon succeeded in becoming "one of the boys."

"It takes an edge," CPT Sherlock says, "and that edge can be obtained by advanced education." She is now a PhD candidate in industrial engineering with only her dissertation to go. She did it all in night school while training to be an astronaut by day. "That's what makes you really stand out," she says. "You really have to stand out as a woman," she adds.

There's another aspect to the pressure a military career puts on its soldiers—both male and female. Long hours, frequent moves, and lengthy absences can contribute to a stressful family life. CPT Sherlock is an example. She will probably soon fly on a mission only a few will ever have the privilege in which to be a part. She has a young daughter who is most likely headed for a successful long-term career in the military.

The hardship of being away from her husband while he served two tours in Korea put serious stress on their marriage, CPT Sherlock says. Just when it came time for him to come back to the United States, she was accepted to NASA in 1987. He went on to Fort Ord, CA. They are now divorced.

It is possible for two soldiers to marry, have children, and make it through the frequent separations and the possibility of both being deployed to combat. However, this is not likely, says Colonel (COL) Robert Seigle, deputy assistant commandant, Aviation Warfighting Center, Fort Rucker. "It's natural for a marriage to be oriented toward a family," he says. "Family responsibility falls mostly to the wife. That naturally argues against very many women making it to the top—they had to give up something en route," he continues. "You have to make the choice—family or combat—up front."

Not only does COL Seigle often address the issues of women in the military in his position at Fort Rucker, but the issue is hitting close to home. His daughter, Leigh Ann, graduated from flight school last September and married an Apache pilot. Her commitment to the Army is only 6 years, a result of her Reserve Officers' Training Corps (ROTC) scholarship. She and her father acknowledge she and her husband, Mike, may start a family and then both be deployed to combat.

"The military is unlike the civilian world where a woman can have chidren, take some years off to raise them if she so chooses, and still reenter the work force later." COL Seigle adds, with a smile, he and his wife will happily keep any grandchildren. Over the long run, what Mike and Leigh Ann decide is fine with him.

Leigh Ann, now 2LT Musiol, a Fort Rucker-trained Chinook pilot and Chinook section leader, 18th Aviation Brigade, XVIII Airborne Corps, Fort Bragg, sees a choice for her on the horizon between a family and career. "Right now, I'm not looking at the Army as a career, because I do want a family," says 2LT Musiol. "Child care is a big issue for women in the military," she says, "because as you progress up the ranks, the chances of a husband and wife being stationed together become less and less."

"The higher a female soldier's rank," 2LT Musiol observes, "the higher the chance she is divorced."

Child care was a big enough issue for Mrs. Diana Juergens, a former UH-1 pilot, that she stepped out of the Army just when she was offered the chance to command a company—a position held by only 45 female aviation officers.

In 1985, she graduated from the University of Wisconsin, Green Bay, under an ROTC scholarship and was commissioned into the regular Army. Mrs. Juergens decided to join the Army, because a cousin was married to an Army officer and their lifestyle seemed exciting. "The Army seemed great to me," Mrs. Juergens says,

"because I thought I could take care of myself. I certainly wasn't going to depend on any man."

She attended flight school at Fort Rucker from 1985 to 1986. In flight school, she met then 2LT Richard Juergens. Both received orders for Fort Lewis, WA, became engaged, and were married there later.

At Fort Lewis, Mrs. Juergens was the supply officer for her unit and did such an outstanding job that she was made the executive officer for headquarters. While in that job, she discovered she was pregnant. Thirty days after delivering her daughter Elizabeth, Mrs. Juergens dutifully returned to work and put her whole heart into it as she did before. However, during a field exercise in September 1989, Mrs. Juergens felt her heart being tugged toward home. In December 1989, she and her husband were promoted to captain. She was offered a company command to begin in the summer. No woman had ever commanded in that brigade.

Though her heart was still telling her to turn home, she did not refuse the job until March of 1990. During a church service, she knew God was telling her to leave the Army and be at home with her child. She was still a year shy of fulfilling her 5-year commitment to the Army. "I just prayed for a miracle," she says, "because not only did I have to be approved to get out, but in my heart, I still really loved my job. When I turned in my paperwork, my battalion commander fully supported my decision."

"You can do it by yourself, but when you have a family, the Army still wants all of your time. You can't do both, which is what the Army expects," she explains. "The demands of a military job cost me not seeing my daughter," she says.

"I won't say the Army is not a place to go for women," Mrs. Juergens says. "You have to know where to find your identity. My heart's desire is first to identify with Christ and my family. In the Army, it's always Army first," she explains.

Today, she resides with her husband at Fort Rucker with Elizabeth, now 4, and 1-year old Hannah. Mrs. Juergens feels more complete and content than ever.

"In aviation, it is more difficult to balance family obligations while maintaining aviation career status and proficiency," says CPT Carolyn Walter, personnel systems manager, Aviation Proponency Office, Fort Rucker, "because of the Aviation Career Incentive Act."

"For an officer, the Army regulations and policy require her to have the equivalent of 9 years of flight duties in 12 years. This is difficult," CPT Walter continues, "because of schools and other responsibilities that keep officers from flight duties."

When you add any time a female is permanently grounded for pregnancy, it is impossible to meet requirements.

For those women who are in and want to stay in, no matter what the cost, flying in combat is agreeably the next big obstacle to seeing all military positions open to women. "If the Army decides to open combat positions to women after hearing the report of the committee in Washington, DC, women could be trained in the Apache attack helicopter in little more than 10 weeks," CPT Walter says.

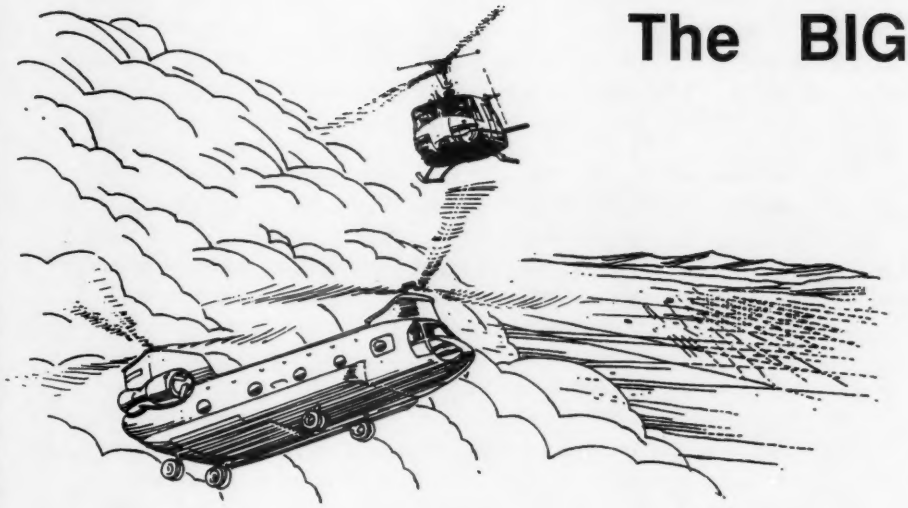
"An average male soldier enters the Army and remains anonymous," says Chief Warrant Officer (CW2) Dawn Stirling-Smith, deputy chief of protocol and an UH-1 pilot at Fort Rucker. "A female soldier is never anonymous," states CW2 Stirling-Smith.

Whether that day comes sooner or later, women in uniform today just want to do their jobs—be it working as a staff officer, flying a utility helicopter, or commanding troops—and to be respected for what they do. Though they wear the same uniform as their male counterparts, it's hard to cover up the difference, she says.

The road to success in the Army and the choices along the way sometimes seem harder for women. It may be more of a sacrifice for women than for many of the men to serve their country. If desire, complete dedication, and a fighting spirit make a good soldier, you can find it in the eyes of the women.

photo by SP5 C. Drake

In 1975, Captain Linda McDonald Horan was the first female officer to complete the Aviation Maintenance Officers Course.



The BIG Picture On Human Error

by CW3 Alfred L. Rice

Much has been said about *Human Error* as the major cause of aviation mishaps. Human error mishaps are caused by one or more of four failures—training, leadership, standards, or individual. Most of us who read *Flightfax* often read it with these questions in mind: who *failed*, what, where, when, and why.

It is understandable why, as pilots, we sometimes become defensive when we hear the term human error. Most of us sometimes feel events happen that seem beyond our control. Can we really have control over events? Can we stop human error mishaps? We have established the fact that, if there is aircraft damage, personal injury, or a fatality, human failure probably was involved. We have met the enemy, and we are the enemy. Fortunately, many human failures do not result in mishaps. Often, only luck or providence separates us from being a statistic. If we were all perfect, we could reduce our accident rates to near zero—the dream of every commander and safety officer.

The great strides we have made in aircrew coordination and risk management are due to noble efforts of concerned stewardship over our material and human warfighting capabilities. Both programs help check and control human failures. To understand our human failings, we need to look no further than the data from our civilian counterparts in the Federal Aviation Administration. A few years ago, the chairman of the National Transportation Safety Board admitted that "with existing data . . . we do not know why pilots make errors." The following predictable factors are common causes of most human error mishaps:

- ***Judgement.*** Pilots continuously make decisions about the safe operation of their aircraft. Some pilots do not exercise good judgement as well as others. Some have no qualms about doing a steep approach into a confined area while others would go around the area. This quality represents common sense and maturity. Gun-runs on recreation boats and other friendly vehicles are considered an exercise in poor judgement. Good judgement is a quality that sometimes can be developed with good mentorship.
- ***Preoccupation.*** Preoccupation is the lack of alertness. A safety message by Major General Rudolph Ostovich III, in December 1990, described this factor as, "not focusing on the task at hand." This description is true and is not limited to daydreaming. A pilot preoccupied with a zone reconnaissance or a call-for-fire that allows his aircraft to drift into the same airspace with hardwood trees generally is considered distracted. Having a close call or seeing other pilots have mishaps can help stimulate one's focus.
- ***Personality.*** Pilots have personalities. Our cultural backgrounds often influences our personality. A pilot's intentional disregard for procedures may be considered an act of defiance. In a profession in which pride and confidence are prized character traits,

there is often a fine line between the gung-ho soldier and the risk taker. Pilots with risk-taker personalities often have recurring mishaps. A risk taker may try to fly nap-of-the-earth 1 inch above the trees when 3 feet will do as well. Some risk takers are considered to be bored individuals who subconsciously seek excitement in an otherwise mundane and routine existence. A risk management and a leadership climate, in which macho aerial cowboys are not encouraged, can sometimes keep this factor in check.

- ***Training and experience***. Many flight tasks develop perishable, poorly developed skills. This factor often is the cause of hard landings. The recency during which a pilot practices nonstandard maneuvers often is a factor in his ability to perform these skills when it counts. During Operation Desert Shield and Operation Desert Storm, lack of training and experience in desert operations caused night vision device (NVD) mishaps. Flying in new situations often presents different operating characteristics that are unfamiliar to the pilot. When faced with crises situations, we often revert to previous training. This factor is influenced best by a good crew mix, continuation training, and basic pilot skills.
- ***Sensory inputs***. Encounters with spatial disorientation are deadly while flying aircraft. Visual and vestibular illusions affect our actions during the undesirable situations we may encounter while flying. Verbal communication with copilots, controllers, and flight engineers is sometimes confusing or unclear. Sensory overloads cause errors and difficulty in making decisions. Good communication is essential. Often the lack of verbal communication from copilots causes us to make wrong decisions. Pilots need to remember safe flying is based on aircraft control. Reconfirming sensory inputs by other verbal and visual means is essential.
- ***Stress and fatigue***. Stresses that are psychological or physiological can affect our performance and prevent us from operating at our maximum potential. Impulsive actions and hasty decisions are often the result of stress. Unintentional omission of critical tasks results from fatigue. The underlying problem of stress and fatigue may lead to errors in preoccupation and poor judgement. A well-established circadian rhythm, proper rest, good diet, and good physical fitness assist in managing stress and fatigue. Avoiding the self-imposed stresses and proper crew endurance remain the effective countermeasures against this enemy.
- ***Planning***. Careful and detailed planning of weather, altitudes, headings, routes, fuel requirements, frequencies, appropriate modes of terrain flight, and the alternatives for these considerations reduces the variables of unexpected circumstances. Many errors in the cockpit are the result of hasty and poorly thought out decisions. If most decisions for the flight are made at the planning table, the errors in the decisionmaking process while flying are reduced dramatically.

When accidents occur, normally more than one of these factors is present. A pilot with financial problems, 3 hours of sleep, experiencing vertigo while completing a steep, confined-area approach under NVDs with a 20-minute fuel light, and flying on the last night before he goes noncurrent has stacked the cards against his favor. Will this joker have a mishap? The wild card in this equation is the other pilot—the copilot. If this joker is paired with an ace, he may live to play another day.

It is easy to count the number of mishaps that occur. However, it is almost impossible to count the number of accidents that have been prevented because of vocal, alert, and knowledgeable copilots—the person not on the controls. The pilot not on the controls may fail to realize the hazardous situation. He may realize the hazardous situation, but fail to respond (sometimes because of intimidation), or he may respond to the situation inadequately (poor timing).

The challenge for all Army aviators is to develop professional pilot qualities of good planning, judgement, and an alertness to hazardous situations. We must be constantly aware that our psychological and physiological limitations will continue to result in human errors. We must continue to reassess how aviation systems such as leadership, training, and publications play roles that allow human errors. We must discover new and innovative ways of improving system inadequacy. As leaders and trainers, we may not be able to eliminate all hazards completely. We should address these factors as we apply the principles of aircrew coordination and risk management as methods of reducing human error mishaps. ❐

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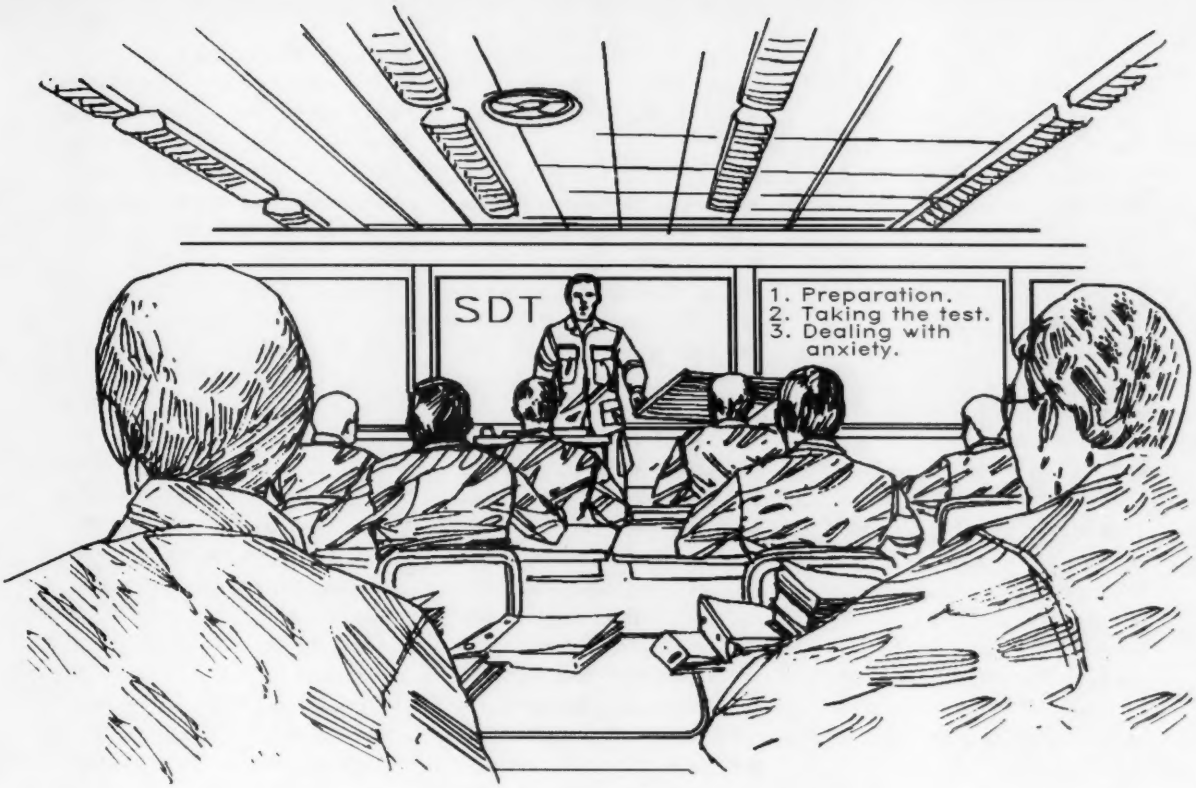

Preparing for the SDT

by Mr. James D. Webber

Certain things continue to recur during our lifetime that, although seemingly unpleasant, are necessary. In the Army, one of these necessities is the self-development test (SDT). The SDT rolls around every year like clockwork. It plays a major part in a soldier's promotion and his retention in service. Therefore, good performance on this test is essential. This article explains briefly how the SDT is structured and gives you some guidelines for improving your performance on it.

Test Structure

The service-wide SDT uses multiple-choice questions. There are no essay or true/false questions. Every question on the SDT must relate to a task for the military occupactional specialty and skill level of the soldier taking that test.

There are no ***trick*** questions. The U.S. Army Training and Doctrine Command provides guidelines that govern the wording of questions on the SDT for Army service schools to follow.

Three Steps for Successful Test-Taking

There are many things for you to consider when faced with taking the test. However, these considerations can be placed into three major step—preparation, taking the test, and dealing with anxiety. Let us explore these steps individually.

Preparation

There is no substitute for preparation. The smartest ways to prepare for the test are to—

- Read the SDT Notice. You should receive the notice 90 days before the scheduled test date. This notice will provide study guides for your SDT.
- Study the performance steps in your soldier's training publication (STP) for the tasks listed in the SDT notice to be tested. When studying the performance steps for a given task, use the referenced technical manual listed in the notice that covers the performance of that task. Nothing is wrong with talking to others who have taken the SDT. It might aid you in decid-

ing what material to stress in your studying. Remember, however, that what seems important to someone else may not be important to you. There is no substitute for ***studying***!

- Test yourself after studying each task. This self-test will ensure that you have a comprehensive understanding of the task and how to do each step in the task.
- Assign each task a rating of 1 to 10, depending on how difficult you find the task to understand and do.
- Finish studying the tasks about 2 weeks before the SDT. Use the last 2 weeks for ***review***. Review those tasks that you found the most difficult. ***Do not*** restudy the whole test.
- Relax the night before the test. Do something that will take your mind completely off the test. Do not stay up late cramming; you will only frustrate yourself and probably forget everything you crammed anyway.
- Get a good night's sleep the night before the test. When you arise on test morning, eat a good, light breakfast. A heavy breakfast will make you drowsy and reduce your performance on the SDT.
- Find a quiet place, just before the test and concentrate on reviewing only those tasks you had the most trouble remembering, if you feel the last minute need to cram.

Taking the Test

You should be on time and know where and when the SDT is being given. If you have a choice, sit in the coolest part of the room. Studies show that people do better on tests given in cool rather than warm rooms. Listen to the proctor; fill out identifying information correctly, and find out exactly how much time you have to take the test. Make sure your test booklet is complete and follow all instructions.

Although the following steps will not ensure a perfect score, these steps should help you to improve your score:

- Read the question carefully, but ***do not*** look at the answer choices. Think of what the correct answer should be. Now, read the answer choices. Mark the choice closest to yours on the answer sheet and go on to the next question. If none of the answers are close to you answer, skip that question for now and move on. Following this process will enable you to answer all the easy questions first. This method will build your confidence and allow more time for the harder questions. Sometimes, test takers use so much time struggling over the hard questions first, they run out of time and leave some questions unanswered. They lose points by never getting to the easy questions that may be at the end of the test.
- After you have covered the entire test, return to the questions you skipped. Read the questions again, ***do not*** look at the answers. Think again of what the correct answer should be. Perhaps a question you have already answered will give you a hint. Pick the choice that seems closest to your answer.
- If you have tried the above method and still do not know with the answer, then ***guess***. Do not sit there and worry about the question. Worrying will never get you points and will only succeed in increasing your anxiety.
- Do not change answers unless you are very sure your first choice was wrong, or you marked your answer sheet in the wrong place. Your first choice is usually correct.

When 15 minutes are left, skip any question that does not seem to have an answer and move quickly through the remaining questions. When 5 minutes are left, use the guessing method mentioned before.

Dealing with Anxiety

It is normal to get a bit nervous before taking the SDT. After all, promotions and service retention could hinge on the results. However, some people panic at the thought of taking a test, and their minds go blank at the sight of a test booklet. If you see a bit of yourself in this description, here are a few helpful hints—

- Follow closely the steps outlined in preparing for the test. Knowing the subject matter will make you feel more confident.
- If you happen to be a highly nervous person, seek long-term help from your medical personnel. Besides interfering with your ability to take the test, too much anxiety and stress is bad for your health and can lead to serious physical problems.
- If possible, visit the testing room several days before the test. This will make you feel more comfortable on test day.
- Get a good night's sleep before the test.
- On test day, be on time, but do not get there too early. Hanging around waiting for test time will only add to your anxiety, and you do not need that.
- Remember the guidelines about skipping over the hard questions and doing the easy ones first.
- Think past the test. Remember, when you walk out of the room after the test, you will still be the same person as before.

We hope you find these guidelines helpful. Keep in mind that though these suggestions may help you get a better score, good study habits are the best way to prepare for the SDT. ❐

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Building An Aviation Battalion Task Force

by Major (MAJ) Bob Hester
and
Captain (CPT) Shawn Wiant

This article discusses some considerations for building an aviation battalion task force (TF) for contingency operations. It supplements appendix D, Field Manual 1-111, August 1990.

Operations as a TF often are made difficult when the staff lacks expertise in the employment of all TF elements, there is no common standing operating procedure (SOP), and the various elements have not trained together enough to form habitual relationships. This discussion applies at battalion level and above; however, we will address specifically the aviation battalion TF.

The aviation brigade is the focal point for creating an effective task organization. This is the first level at which one commander owns all or most of the requisite assets and is staffed to command, control, and maintain them. The brigade commander can build a battalion TF with staff expertise in all of its slice units. He can direct commonality of SOPs in the critical areas that affect interoperability among aviation brigade assets. He can fence training time and build habitual relationships so that the key players aren't strangers to each other when the fight begins.

Building the Battalion Task Force

As an illustration, let's build a generic battalion TF such as one that might deploy to the Joint Readiness Training Center (JRTC), Little Rock Air Force Base, AR. We will start with a battalion headquarters and headquarters company. It could be any of the battalions in the aviation brigade; however, we will use an assault helicopter battalion for this example. The maneuver units will be one assault helicopter company and an attack helicopter company. A slice of the combat aviation company may enhance command and control (C^2).

Since the battalion staff does not include an S2 or fire support officer (FSO), we will supplement the TF with an S2 section and an FSO/fire support element (FSE) from brigade. Since the assault battalion staff may not be well-versed in planning attack operations, we will send an officer with attack experience to be the assistant S3. We will choose liaison officers to represent the TF who are competent and experienced in several aspects of aviation employment. Ideally, they should be former company commanders and should know something about both assault and attack operations, so they can represent the whole TF better. Now we should have a well-balanced headquarters for our organization.

To supplement the support from the headquarters company, we will add a Class III/V section with its platoon leader, or platoon sergeant; an appropriate slice of the aviation unit maintenance (AVUM) platoon with test pilots; and a slice of aviation intermediated maintenance (AVIM). We will include those low-density military occupational specialty (MOS) soldiers and scarce equipment necessary to maintain our aircraft and equipment in the field. We also may add a flight surgeon to pull maintenance on our flight crews in the field. With that our TF should be able to sustain itself for a reasonable period of time.

Up to now we have a task organization with which we feel fairly comfortable because the command relationships are clear; everyone above works for the battalion TF. Now let us muddy the water some by adding a forward support medical evacuation (MEDEVAC) team (FSMT) and a QUICK FIX platoon to our organization. The TF relationships with these elements are not as clear.

Let us briefly review MEDEVAC doctrine and some concerns to see why and how the FSMT fits in the aviation battalion TF.

New MEDEVAC doctrine places a FSMT (AIR) with the forward support medical company (ground), which usually is located with the forward support battalion in the brigade support area (BSA). The division medical officer normally designates the forward support medical company commander as the medical regulating officer (MRO) for the contingency brigade. The MRO is responsible for medical evacuation in the brigade's area of operations. He determines whether medical evacuation will be performed by ground ambulance or air ambulance. He should, therefore, have operational control of the FSMT.

There are other considerations, however. For example, the FSMT must rely on the aviation battalion TF for aircraft logistic support since the

forward support medical company is not equipped to support aircraft. The other major concern is battle tracking in the BSA. Normally, neither the BSA nor the forward support medical company maintains a current friendly or enemy situation, which the FSMT needs before sending an aircraft on a mission. Finally, there is the airspace consideration with more than one aviation operation occurring in the brigade's area of operation. MEDEVAC operations must be coordinated with other aviation missions to prevent conflict and to provide mutual support.

Based on the above, one practical solution is to attach and locate the FSMT with the aviation battalion TF for administrative and logistic support. The FSMT will remain under the operational control of the forward support medical company, except when otherwise stated in the infantry brigade TF order (e.g., member of an air assault TF).

This solution offers several advantages—ease of logistic support to the FSMT; FSMT access to a current friendly and enemy situation; ease of airspace C^2 integration; and ease of coordination for aviation TF, which impact on the FSMT or will be accompanied by the FSMT.

The other slice element, the QUICK FIX platoon, may be part of the aviation TF for many of the same reasons. The same advantages exist with similar command and support relationships. Missions tasking for the QUICK FIX platoon comes from the infantry brigade TF transcription and analysis (T&A) cell. The data the platoon collects usually must be downloaded there. The contingency brigade commander must consider the distances involved, and the ability to command, control, and download data from the QUICK FIX platoon in deciding whether or not to collocate it with the aviation TF.

We must take several steps to enhance the integration of the FSMT and the QUICK FIX platoon in the aviation TF if it is to be done. The FSMT should be able to provide a 24-hour liaison officer with a secure radio to the aviation battalion TF tactical operations center (TOC). The FSMT does not have secure radios organic to it, so one must be obtained from another source before deployment. The purpose of the liaison officer is to tap the available information at the TF TOC and maintain communications with the forward support medical company for MEDEVAC requests. He also can inform the medical company if MEDEVAC requests come directly to the aviation TF, as they sometimes will. In case of mass casualties, the liaison must know the location and capability of the forward medical and hospital units in the area.

The QUICK FIX platoon will not require a 24-hour liaison, since its missions are usually forecast well in advance. However, they still need face-to-face coordination as the situation dictates.

We have built a TF with expertise in all assets by supplementing the assault battalion staff from within the brigade and from attached assets, as much as possible. We have integrated a FSMT and a QUICK FIX platoon into our organization and discussed their command relationship to the TF. Now that we have the TF designed and understand the command relationships of the its elements, we must now define its operations and procedures.

SOP For the TF

The TF needs an SOP for the same reasons any unit does—to effect command, control, communications, and operations (administrative/logistics inclusive) without lengthy, detailed orders. This will not necessarily be the perfect SOP, but one which everyone knows and understands. Since most units have SOPs, I think we understand their importance and we will not belabor the need for one. Instead, we will discuss the SOP problems of a task organization.

The crux of the problem is the integration of different units, which normally operate under different SOPs. The solution is to create an SOP that accounts for their differences. The aviation brigade is the focal point for establishment of this TF SOP. An existing battalion or brigade SOP could be used as a base and modified for TF operations, or a new SOP could be written specifically for them. In either case, it is not practical to try to write a specific SOP for each contingency mission and its related task organization; nor is it practical for each battalion headquarters to modify its SOP or write a TF SOP each time it is task organized.

The brigade should attempt to develop a TF SOP that is flexible enough to cover its foreseeable contingencies. There is no school solution to approach this task, but let us see how we might develop a TF SOP. First, we will evaluate our contingency missions to identify a core task organization. We recognize that the headquarters will probably have to perform some of the functions normally performed by brigade. The headquarters may resemble the one we built earlier.

Our next step is to compare the brigade SOP, all battalion level SOPs, and possible aviation attachments from outside the brigade to identify common procedures and differences. We resolve as many differences as reasonable, and we develop standardized TF procedures for use

throughout brigade. We attempt to build an SOP that is centered on the core task organization and is flexible enough to accept attachments. Battalion- and attachment-unique procedures should be included in the SOP, when appropriate. Use of appendices for unique procedures, and an appendix for each attachment, may add flexibility. Another appendix that could prove helpful is a checklist of critical MOSs; special tools; parts, aviation intensive management items included; and equipment needed to support each task organization.

To ensure that our task organization and its SOP are adequate, we should wargame several scenarios, looking at the assets we need, the command relationships that work best, TF staffs that function smoothly, and common procedures that ease the integration of various elements.

Finally, we should train as we are going to fight for contingency missions—as a TF. We need to set aside time to train our aviation contingency TFs just as most divisions set aside training time for Combined Training Center trainups. We need to ensure all TF assets participate in the training under the most demanding conditions possible. By designating units for each TF headquarters and conducting TF training periodically, habitual relationships between the TF headquarters and attachments can be formed. When we reach this level, task organizations and contingency missions will become second nature; and Army Aviation will become a more flexible member of the combined arms team. ❐

MAJ Hester and CPT Wiant are assigned to the Joint Readiness Training Cener, Little Rock AFB, AR.

Aviation Brigade Participation at the JRTC

by Colonel (COL) Ed Littlejohn

Starting in the summer of 1992, an Aviation brigade command and control element will be authorized as a participant at the Joint Readiness Training Center (JRTC), Little Rock Air Force Base, AR. This is significant for a number of reasons.

First, it enables the Aviation brigade commander to perform key elements of his mission essential task list and provides a powerful venue for training his staff. Although the aviation centerpiece will still be the Aviation task force (TF), the brigade element will be able to plan future operations, manage logistics support for the TF, and influence Army Airspace Command and Control. This will unburden the Aviation TF so it can concentrate on execution of current operations and short range planning.

Aviation brigade participation will improve the probability of success for the Aviation TF, because it will allow the TF to remain more focused on the mission at hand. This will provide a doctrinal division of labor in keeping with our table of organization and equipment structure. One echelon will compliment the other.

Also, Aviation Brigade participation at the JRTC will enhance our integration as a member of the combined arms team. Despite our recent successes in Operation Just Cause and Operation Desert Storm, misperceptions about Army Aviation exist throughout the Army. A recurring Aviation brigade presence at the JRTC will help to dispel these misperceptions. Not only will it improve our level of training, but it will repeatedly reinforce to our sister combat arms what Army Aviation can contribute on the modern battlefield.

The Combined Training Centers will continue to be the premiere training grounds for a shrinking Army. They will remain the best opportunities to integrate the combined arms and vehicles for evaluating our doctrine. Opening the door to Aviation brigade participation is a major step that we should boldly take. It will improve the awareness, across the force, of the inherent capabilities of Army Aviation. Our value on tomorrow's battlefield will be even greater than it is today. ❐

COL Littlejohn is assigned to the Joint Readiness Training Center, Little Rock AFB, AR.

Move, Shoot, And Deactivate

by Captain (CPT) Carl L. Giles

Your unit has just received the mission to deactivate. In U.S. Army, Europe (USAREUR), where deactivation has become a common task, this means that, in 120 to 180 days, your unit will cease to exist. Soldiers and their families with more than 18 months to their date of expected return from overseas (DEROS) are reassigned within USAREUR. All others depart the theater.

The challenge of uprooting hundreds of families and severing the chain of command with your soldiers during such a limited period is so difficult and traumatic a gunnery rotation is a welcome relief. This trauma is compounded by the fact that none of the Army's service schools prepares leaders for the challenges associated with deactivation. Is your unit next on the chopping block? Are you ready to take care of your soldiers and their families and still complete your mission? My observations as the adjutant of the 1st Squadron, 1st Cavalry, 1st Armored Division, USAREUR, during drawdown can lead you in the right direction.

First, dedicate yourself to giving your soldiers the best possible care. It is easy to lose sight of this ideal as their departure date approaches. The pressure of maintaining the drawdown schedule, while attempting to solve a myriad of soldier problems, tempts even the most dedicated leaders to adhere to the old adage, "out of sight (permanent change of station), out of mind (mission complete)." However, once the unit flag folds, you can no longer take care of your soldiers. If a soldier's noncommissioned officer efficiency report (NCOER) was completed improperly, his end-of-tour award overlooked, or a bar to reenlistment not lifted, his ability to correct these errors or right any wrongs may be limited severely after deactivation. A proactive NCO chain of command can monitor each soldier's clearing process. I recommend, however, that you personally interview each soldier before his departure to ensure proper care. This action reestablishes the soldier as an individual after the outprocessing ordeal, and it helps him leave with a good feeling about the unit.

Second, conduct a thorough personnel asset inventory (PAI) as soon after notification as possible. Pay particular attention to your personnel data base (DEROS and expiration term of service dates and primary military occupational specialty), Department of Defense (DD) Form 93 for dependent information, and reenlistment contracts. The personnel services company and the U.S. Total Army Personnel Command (PERSCOM) use this information to determine reassignments and create orders.

I waited too long to conduct a PAI; it caused confusion, heartache, and increased my Personnel Action Center (PAC) workload. You would be amazed at how many of your soldiers forget to add their spouse and children to the DD Form 93, and the subsequent problems you inherit. In addition, be aware that many agencies within the Army use your data base to make decisions concerning your soldiers. Any adjustments you make to your data base should be forwarded to the Assistant Chief of Staff, G1 (Personnel) (G1) for immediate distribution.

Next, increase your PAC training staff. The workload increases at least five times the normal hectic pace. It is easier to conduct personnel actions en masse. For example, submit end of tour awards early and double-check your good conduct medal and driver badge roster.

One technique is to obtain award certificates and order numbers from the next higher headquarters and prepare them yourself. This procedure enables you to avoid the award processing bureaucracy and keep to your schedule. Develop a system to ensure all officer efficiency reports (OERs) and NCOERs are completed before any member of the chain of command departs. Your chain of command must implement strict policies to ensure all efficiency report requirements are met.

Establish a list of points of contact (POCs) for your unit's personnel needs. This list will be extensive when completed. Both the G1 and PERSCOM manage officers, warrant officers, and enlisted soldiers separately. PERSCOM also manages medical service officers and military intelligence officers separately. The rules of engagement for each of these fields are different. Your POC list should include representatives from finance, personnel, reenlistment, legal, outprocessing services, and the household goods transportation office.

The next process may seem redundant to an adjutant; however, I recommend that you personally visit each of these agencies to familiarize yourself with their procedures and clearly outline your anticipated requirements for deactivation. Cultivate these relationships by continual coordination.

Next, integrate family members in the flow of information. Dependents are most vulnerable to hardship during the rapid pace of the packing up and relocating process. They need to understand they play a key role in the mission and much is expected of them. Specific concerns for dependents include school schedules, civilian jobs, medical care, and exceptional family member care.

The most-asked questions are, "When do we leave and where are we going?" Conduct an informative meeting for dependents early in the drawdown process. Tell them what the future holds and what their options are. Army Community Service programs are available to help families with relocating. The key is to reassure family members there is a plan and resources are available for their care.

The most frustrating and time-consuming aspect of deactivation is maintaining an accurate reassignment roster. Three factors cause the constant changes in a soldier's follow-on assignment. An inaccurate data base may cause a soldier who should remain in theater to receive orders to continental United States, and vice versa. The inaccurate data base proved to be a sore spot for deactivation, which required deconfliction case-by-case.

PERSCOM changes orders based on the new personnel needs. Guidance given to PERSCOM based on modification table of organization and equipment (MTOE) levels and housing availability at the next installation drive change in orders. To protect the interests of our soldiers, the command implemented a local policy that enabled soldiers who had already shipped their household goods to travel to their original follow-on assignment.

Changes in orders issued during the last 45 days of the drawdown were most likely against regulations. However, with general officer endorsement, this policy proved effective in maintaining stability. The soldier was reassigned to the installation of his choice. The soldiers who received letters of acceptance from local unit commanders fought to change their orders and remain in the community to fill valid MTOE shortages. Most of these requests made sense.

Let us face it, deactivation is a number's drill for PERSCOM because of the tremendous volume of soldiers processed. In my experience, only 2 out of 40 such requests were granted despite command involvement. Unfortunately, the drawdown system is not designed for such nonstandard requests. The sooner you recognize this fact, the less time and energy you will expend.

Our biggest obstacle to deactivation was coordinating household goods pick-up appointments. This bottleneck, created by lack of available resources and conflicting priorities of shipment, became the single factor in determining a soldier's departure date. I do not recommend using a power of attorney for the shipment of household goods because any changes to the transportation schedule will create more problems. What do you do when the soldier holding a power of attorney departs before he completes his mandated tasks?

Other setbacks to your deactivation schedule involve the legal and bureaucratic procedures for host-nation travel visas. Normally, it takes 6 to 8 weeks for completion; however, any one of the many local statutes can double the time requirement. In addition, the quarantine period and travel requirements for some pets are so stringent you may be forced to take measures to ensure these pets are not abandoned. For visas, pets, and other possible obstacles to deactivation, the best course of action is to identify problem areas early and attack the system.

Deactivation is a monumental task. It should be, particularly if you are dedicated to a high standard of soldier care. The process requires your best management skills, greatest leadership qualities, and sheer determination. Hang in there. One of those 600 reassignment orders that fill your "IN" box has **your** name on it. ❐

CPT Giles currently is assigned to the 2d Battalion, 229th Aviation Regiment, 1st Aviation Brigade, Fort Rucker, AL.

Comanche, An Introduction

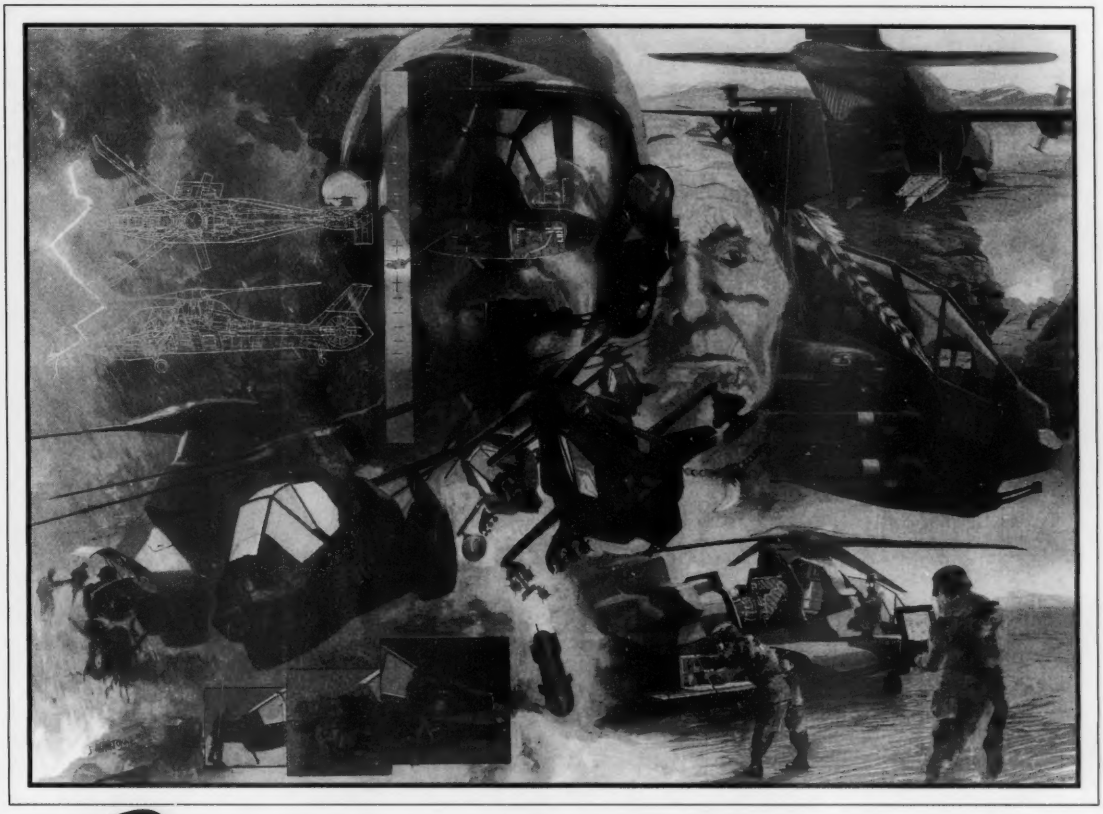
The RAH-66 Comanche is the next generation of rotorcraft the U.S. Army will use. It will replace the aging OH-6 Cayuse and OH-58A/C Kiowa unarmed scout and AH-1 Cobra attack helicopters. In air cavalry and attack organizations, it will significantly expand the capability of the Army to conduct tactical operations in all types of terrain, adverse weather, and battlefield environments, during day and night operations, with increased survivability.

The Comanche—with its increased speed, survivability, air-to-air capability, and mission equipment—will enhance the combat operation of supported forces. By conducting both close and deep operations with improved lethality and survivability, the Comanche will support forward deployed and contingency forces. Force agility will be significantly improved with the Comanche. Its self-deployment capabilities will improve the rapid strategic deployment of Army Aviation and support force projection from continental United States-based forces. One helicopter, the Comanche, will be able to perform the missions better with greater operational and support efficiency than those currently being performed by the OH-6, OH-58, and the AH-1.

Program Milestones

1982 - Army Aviation Mission Area Analysis completed
1983 - Justification for Major Systems New Start approved; technical base preliminary design contracts awarded
1984 - Advanced Rotorcraft Technology Integration (ARTI) contracts awarded; T800 engine teams formed
1985 - Letter of agreement approved; competitive T800 engine full-scale development (FSD) contracts awarded; Light Helicopter (LH) aircraft teams formed
1986 - LH ARTI risk reduction contracts awarded
1987 - RAND/Institute for Defense Analysis studies conducted; program restructured to eliminate LH utility system
1988 - Medium-scale integration approved; T800 engine final source selection (preliminary flight rating [PFR]) concluded; competitive Demonstration/Validation (Dem/Val) contracts awarded
1989 - T800 engine PFR testing completed
1990 - Secretary of Defense program approval; competitive Dem/Val phase completed; LH Source Selection Board initiated
1991 - LH source selection completed; Dem/Val prototype contract awarded; LH designated as the RAH-66 Comanche
1992 - T800 engine production qualification testing currently underway; production of training devices, writing of lesson plans, and production of text materials deferred until engineering manufacturing and development (EMD) phase
1995 - First flight
1998 - EMD milestone II decision

Note: *Copies of other RAH-66 Comanche articles that appeared in the May/June 1991 issue can be obtained by writing to the Editor,* ***U.S. Army Aviation Digest****, ATTN: ATZQ-PAO-AD, Fort Rucker, AL 36362-5042.*



COMANCHE

The Comanche program is alive and developing well. This series of articles in this issue presents some of the latest technological advances in the Army's newest armed reconnaissance/attack helicopter, the RAH-66 Comanche. The authors focus on the management team, the liaison team with industry, the aircraft's operational capabilities and maintenance requirements, and the Comanche's transportability.

COMANCHE

Restructuring to Meet the Requirement

Colonel Stephen S. MacWillie
TRADOC System Manager for Comanche
Fort Rucker, AL

Lieutenant Colonel James M. Delashaw
Assistant TSM—Support
TRADOC System Manager for Comanche
Fort Rucker, AL

NO LONGER ARE we confronted with a monolith of Warsaw Pact Forces perched across the Cold War border between Western and Eastern Europe. There is euphoria throughout the "Free World" about the breakup of the Union of Soviet Socialist Republics (USSR). Headlines during the last 2 years have at times proclaimed that "peace is breaking out all over." However, the sad truth is our world remains a hostile place.

Within a band around the world from latitude 30 degrees N. to latitude 30 degrees S., dozens of countries are embroiled in various levels of armed conflict, and the stability of others is questionable (figures 1 and 2). Currently there are 74 flashpoints and 31 ongoing conflicts within this band. Consequently, a sizeable market for the tools of war exists, and the number of merchants is likely to increase.

Modernizing World Technology

Operation Desert Storm enabled many arms manufacturers to have their products "tested on the field of battle." Now they are in the process of upgrading weapons based on lessons learned. Wealthy nations are seeking newer, faster, and more effective top-of-the-line equipment. Poorer nations are upgrading their outdated equipment with the recent "hand-me-downs" from richer nations. Western arms technology, as well as arms technology from the newly formed Commonwealth of Independent States, is finding its way into Third World countries. South American countries also are upgrading their arms manufacturing industries and hiring arms technology talent from throughout the world.

As countries of the world strive to modernize forces, we are beginning to identify countries with both Western and Eastern weapon systems. This mixture of weapon systems technology (West and East) provides new challenges. Before Operation Desert Storm, we had not seriously considered the possibility of having to face our own, as well as our allies', weapons systems. The result is an evolu-

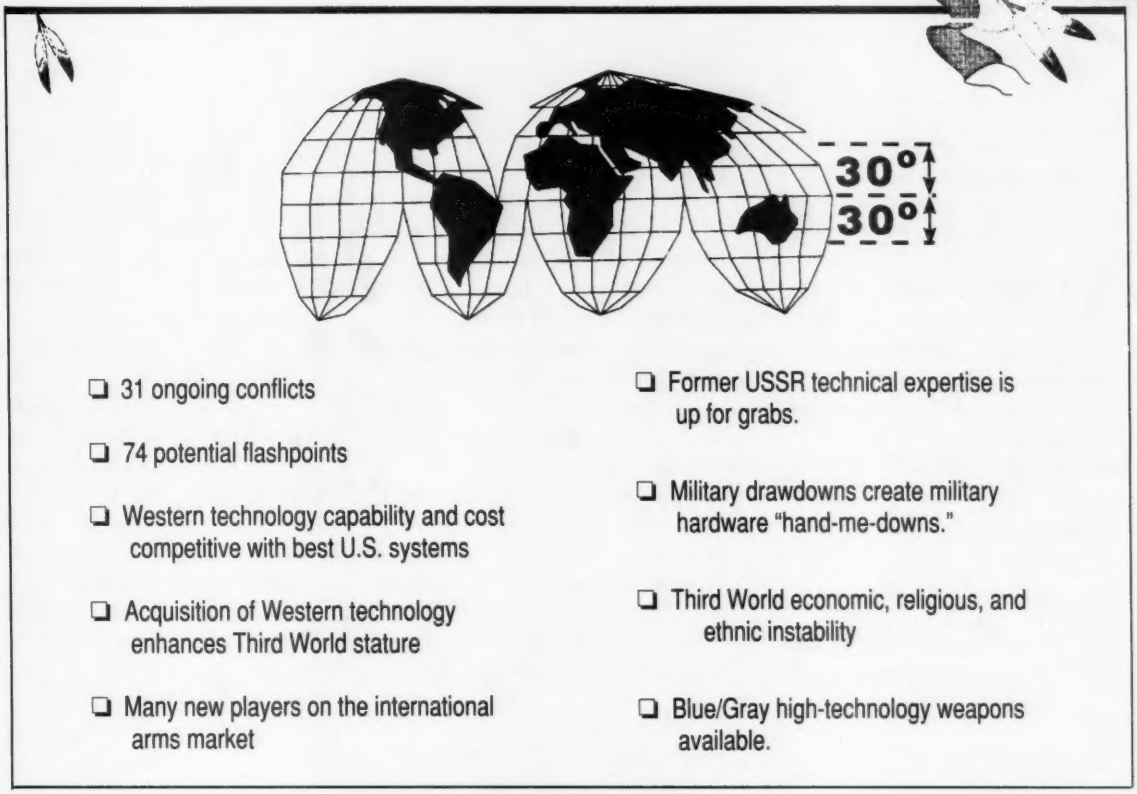

30°
30°
❑ 31 ongoing conflicts
❑ 74 potential flashpoints
❑ Western technology capability and cost competitive with best U.S. systems
❑ Acquisition of Western technology enhances Third World stature
❑ Many new players on the international arms market
❑ Former USSR technical expertise is up for grabs.
❑ Military drawdowns create military hardware "hand-me-downs."
❑ Third World economic, religious, and ethnic instability
❑ Blue/Gray high-technology weapons available.

FIGURE 1: An unsettled world

tion from a specific and well-defined Red threat to a "Blue-Gray adversary" who is difficult to recognize, regionally oriented, technologically current, and whose actions are hard to predict.

Decreasing U.S. Forces

As the world order is changing, so is the posture of the U.S. Armed Forces. Planned force structure reductions indicate a trend towards a smaller Army oriented on rapid response contingency operations. The Army, in support of our national interests, must be a quality force—"a world class army"(figure 3).

Essential to the execution of national strategy is the availability of

FIGURE 2: Tomorrow's concerns

❑ Global modernization of forces

❑ Greater lethality at all levels of conflict

❑ Proliferation of nuclear, biological, and chemical weapons

❑ Potential for lethal weapons used to dissuade U.S. resolve

❑ Potential instability of emerging nations

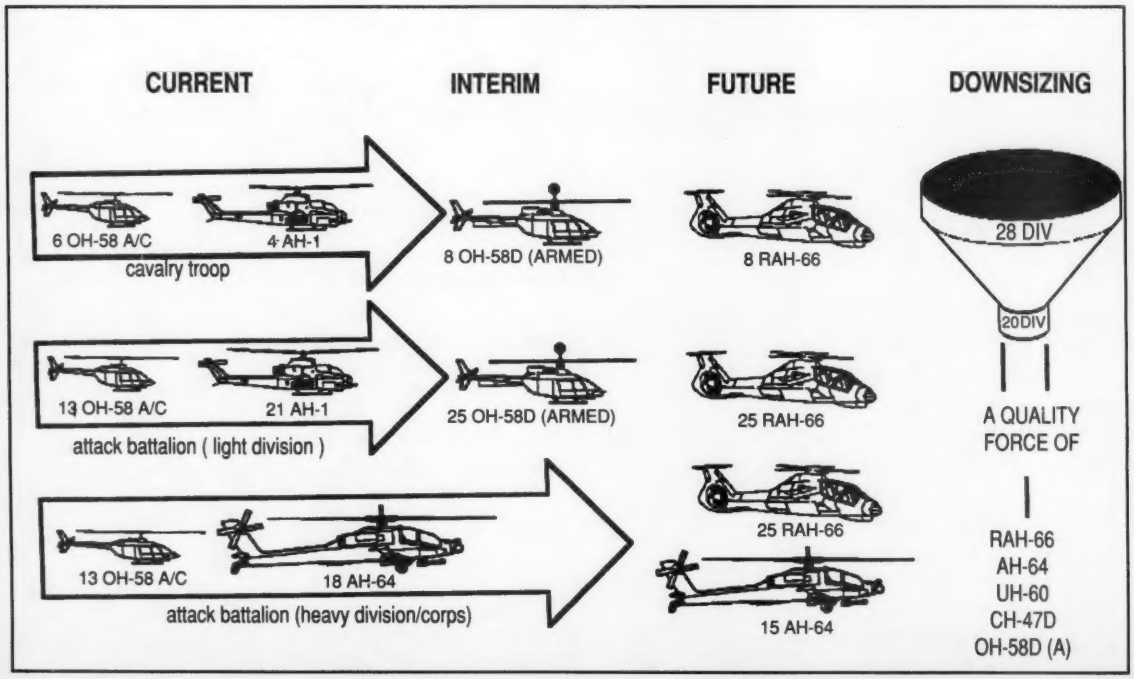
flexible deterrence options across the operational continuum (figure 4). Early arrival of lethal tactical forces intheater adds credibility to deterrence. Regardless of the task, humanitarian aid in nation-building operations or countering terrorism—*flexibility, deployability, ease of employment, and sustainment* are the attributes necessary to accomplish a multitude of missions with a smaller, yet quality, military.

Essential to success in all of these operations is the ability to operate effectively at night, in adverse weather, and in high and hot environments. Our military leadership must have the capability to strike decisively, with effective combined arms combat power, and strike early in any contingency.

Our operational involvement in force projection, four times during the last decade, supports low- to mid-intensity conflict as the most likely warfighting scenario calling for the deployment of our continental United States-based contingency forces. Lessons learned from these operations identify equipment and capability shortfalls that need to be corrected (figure 5). The importance of *deployability, sustainment*, and *night operations* stand out. *Survivability*, a capability lacking on the current light fleet, is essential.

The operational needs of our national strategies determined the design and influenced the selection process for the RAH-66 Comanche. Multimission flexibility enables the U.S. Army to maintain a credible and lethal force while minimizing the expenditure of resources. Comanche embodies the spirit of cavalry and performs armed reconnaissance, attack, and air combat operations. It offers field commanders a first-hand, near real-time look at the battlefield. This enables commanders to accomplish key missions, such as finding relocatables, with one multirole weapon system rather than several specific weapon systems. The result is reduced expenditure of national assets, and operating and support costs.

FIGURE 3: Force modernization



Refocusing Acquisition Objectives

Recent budget decisions by the President and the Secretary of Defense have refocused the Army's acquisition objectives. The Secretary of the Army (SA), Chief of Staff of the Army (CSA), and the Assistant Secretary of the Army (Research, Development, and Acquisition) (ASA (RDA)) fully support the important role of the Comanche in the future of our Armed Forces. Procurement funding has been reduced, but with increased emphasis on research and development to prove out new technology. Once the technology is developed and operationally tested, additional reviews will be conducted to reaffirm the threat, verify the need, and reassess world events and national strategy before going into full production: i.e., we will develop the technology but not always produce the end product.

Restructuring the Comanche Program

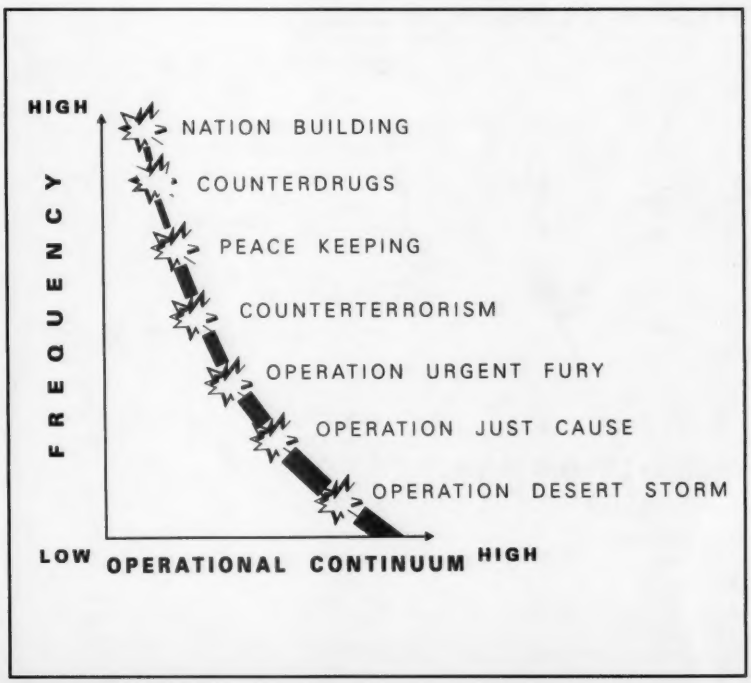
To comply with the new acquisition objectives and budget guidance, the Comanche program has been restructured. The Demonstration/Validation (Dem/Val) Prototype Phase was extended from 52 months to 72 months. The budget for this phase is $1.63 billion for fiscal year (FY) 1993 to FY 1997. During the Dem/Val Prototype Phase, three prototype weapon systems will be built. One of the three prototypes will include integration of AH-64 Apache Longbow hardware. The T800 engine will have "grown" 12 percent to provide the performance required for the integration of Longbow and the weight of combat kits considered necessary from our Operation Desert Storm experience.

The Dem/Val Prototype Phase work is oriented to proving out the critical technology components. Mission equipment development work includes the following:

- Target acquisition system—
  - Aided target detection and classification system
  - Second generation forward looking infrared (FLIR) (40 percent improvement)
  - Day television
- Night vision pilotage system—
  - Second generation FLIR (40 percent improvement)
  - Biocular helmet-mounted displays (35 degrees v by 52 degrees h)
- Centralized processing architecture using Ada software
- "Growth" engine (T800)
- Integration of the Longbow fire control radar
- Avionics

Maximum use will be made of the Longbow hardware from the Apache Longbow program. Weapon system performance requirements (such as vertical rate of climb, maneuverability, agility, and low observ-

FIGURE 4: Operational continuum



ability) have not changed and will be demonstrated.

Comanche will be maintainer-friendly and is being designed for two levels of maintenance with minimum tools and support equipment. Cotter pins and safety wire, as well as torque wrenches, workstands, and ladders, are being removed. Test equipment is built-in; therefore, no separate automatic test equipment is required.

Technical publications will be automated and will reside in the portable intelligent maintenance aid (PIMA). The PIMA provides an automated logbook, which includes troubleshooting guidance, parts lists, and maintenance procedures; and interfaces with the unit level logistics system. The PIMA also incorporates a bit verifier to double-check removed modules before replacement and return to depot. In the prototype phase, logistics support analyses will be conducted to the component level and the PIMA and its built-in bit verifier will be developed and tested. The man-machine integration efforts of manpower and personnel integration are essential elements of the program.

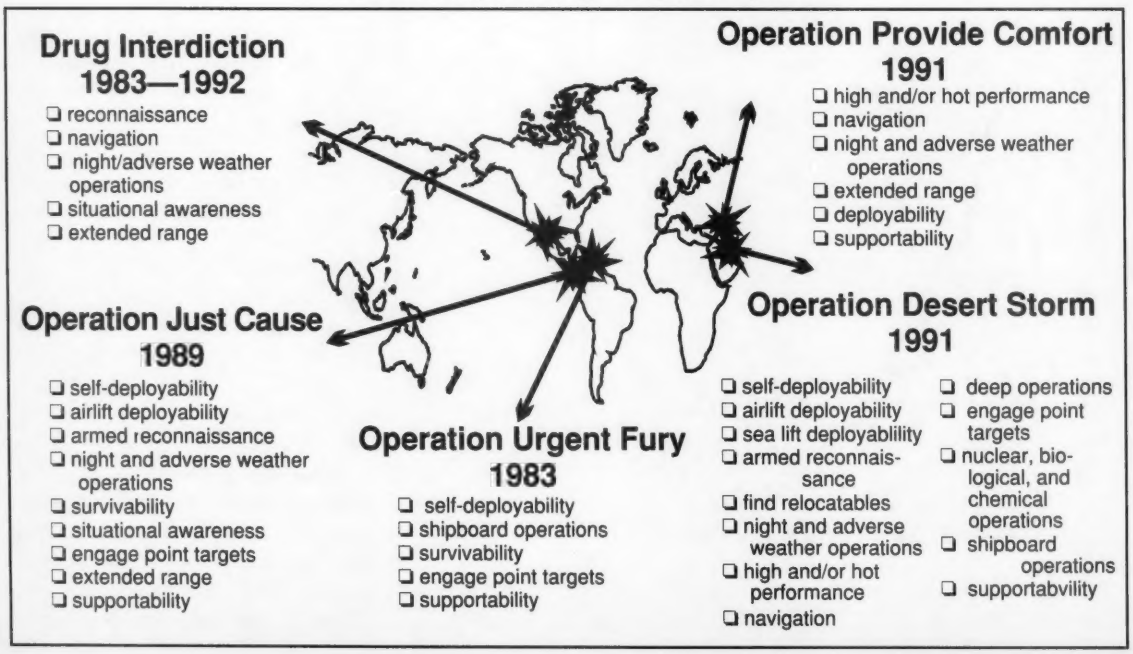
Developing a Complete Integrated Training System

Training system analyses will determine the best media (platform instruction, video tape, and computer-based training, etc.) to train different tasks. The analyses will be oriented to support the development of a complete integrated training system. Actual production of training devices; writing of lesson plans; and production of text materials are deferred until the Engineering Manufacturing and Development Phase.

Conclusion

Recognized as a key component of Army modernization, the Comanche program continues to have full support of Army leaders. In February 1992, at the Association of the United States Army Annual Convention in Orlando, Florida, the SA, CSA, and ASA(RDA) reaffirmed full support of the important role of the Comanche in the future of our Armed Forces.

FIGURE 5: Capabilities required in previous operations



TRADOC System Manager for COMANCHE-FORWARD

Working for our Soldiers

On 12 April 1991, the Army selected the First Team of Boeing Helicopter and Sikorsky Aircraft to continue development of the RAH-66 Comanche. The Comanche provides Army Aviation the opportunity to move into the 21st century with a weapon system of unsurpassed warfighting capabilities crucial to the smaller but more versatile Army force of the future. Comanche will provide our soldiers the capability to respond, on very short notice, to a variety of contingencies throughout our unsettled world. The selection of the First Team was the end of an exhaustive evaluation effort to meet these future challenges.

Major Michael Rusho
Assistant TSM—Forward
TRADOC System Manager for
Comanche
Fort Rucker, AL

Manpower and Personnel Integration

MANPRINT played a significant role in this selection process. What is MANPRINT? The manpower and personnel integration (MANPRINT) program is a weapons systems acquisition initiative, adopted by the Army, that focuses system design to fit the needs and capabilities of our soldiers who will support, maintain, and fight with the Comanche. MANPRINT accounted for 17.5 percent of the evaluation during the Source Selection Evaluation Board (SSEB) for the Comanche and, therefore, had a strong influence on the downselect of the winning design.

The need for considering the soldier in the Comanche design process has not diminished since the selection of the First Team. We must continue aggressive application of the MANPRINT initiative during the Comanche Demonstration/Validation (Dem/Val) Prototype Phase. The bottom line is a Comanche design that is more deployable and survivable; easier to maintain; fits our soldiers; and maximizes the warfighting contribution of the Comanche to the joint and combined arms team. Through the MANPRINT initiative, the user has the opportunity to influence design from the beginning.

User Teams Provided to Industry

Before the downselect, the Army provided MANPRINT support to both Comanche industry teams: Boeing Sikorsky and McDonnell Douglas-Bell. The MANPRINT effort included providing "greensuit" user teams to each industry team. These teams consisted of aviators and maintainers selected from across the Army. The aviators participated in developing crew stations and mission equipment, while the maintainers provided insights on the maintainability of emerging designs. Industry, Program Management, and user personnel agreed that the "greensuit" teams provided invaluable

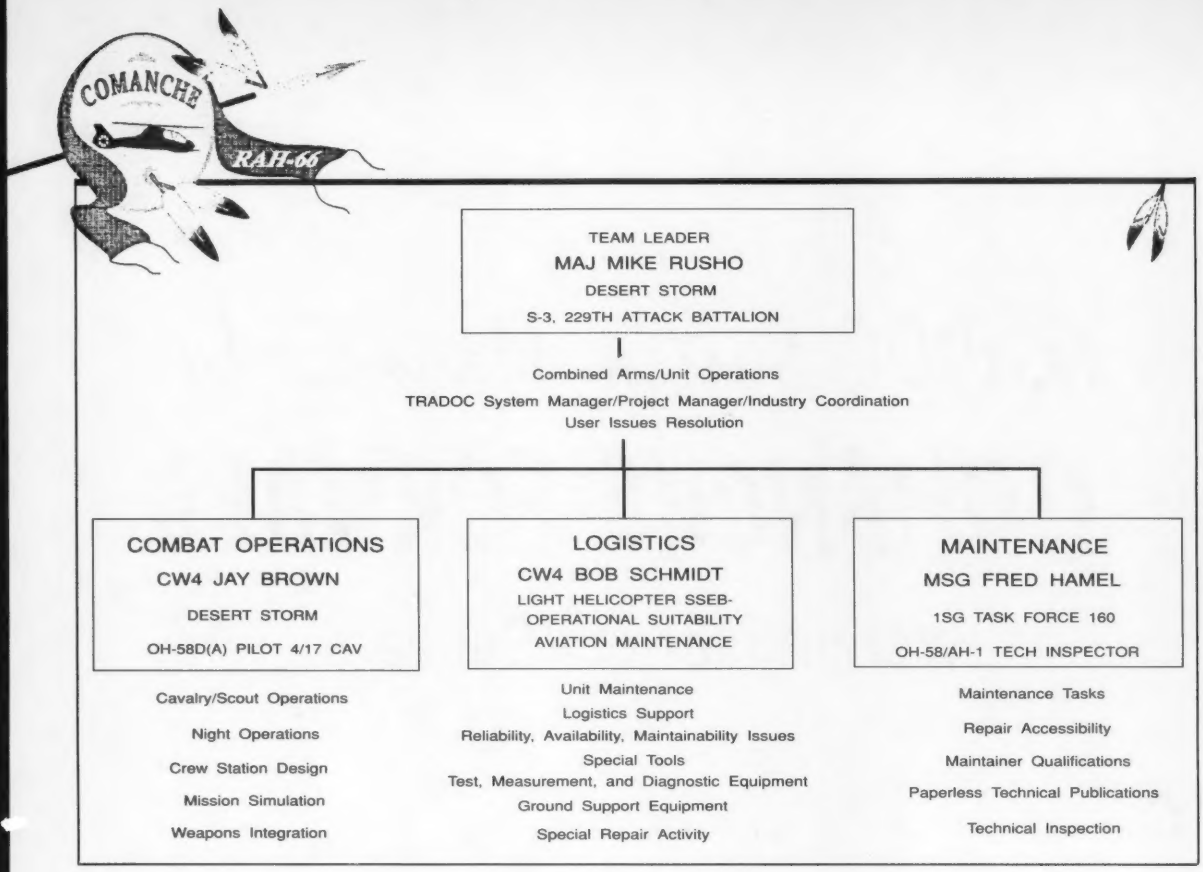


FIGURE 1: TSM Comanche—Forward organization

information and user design influence to the contractors during this critical phase.

After the downselect, the U.S. Army Aviation Warfighting Center, Fort Rucker, AL, desired to continue the MANPRINT influence by establishing an even stronger interface with industry. The challenge was, "How could the user best provide relevant near real-time operational and MANPRINT input to industry?" To meet this challenge, the Army established a user team at the factory. This team helps maximize the benefits derived from upfront design influence. The "greensuit" team is known as the U.S. Army Training and Doctrine Command (TRADOC) System Manager (TSM) for Comanche—Forward (TSM Forward).

Composition, Functions, and Objectives

TSM Forward consists of four personnel with extensive operational, maintenance, and logistics backgrounds. The team is neither a part of the Defense Plant Representative Office residing at the contractor sites, nor of the Program Manager's (PM's) office. However, the team is an extension of the TSM for Comanche, and the personnel are assigned full-time duty at the factory. The team composition and functions are at figure 1.

TSM Forward personnel established a base of operations on 8 July 1991 at Sikorsky's Trumbull facility in Stratford, CT; they began to interface with Comanche industry team members immediately. The Comanche industry team consists of the Boeing Sikorsky PM's Office, Boeing Helicopter, Sikorsky Aircraft, nine prime subcontractors throughout the United States, and one subcontractor in Europe.

TSM Forward established objectives to support the goal of addressing and prioritizing operational and MANPRINT concerns during the Dem/Val Prototype Phase. The objectives, shown at figure 2, fully support

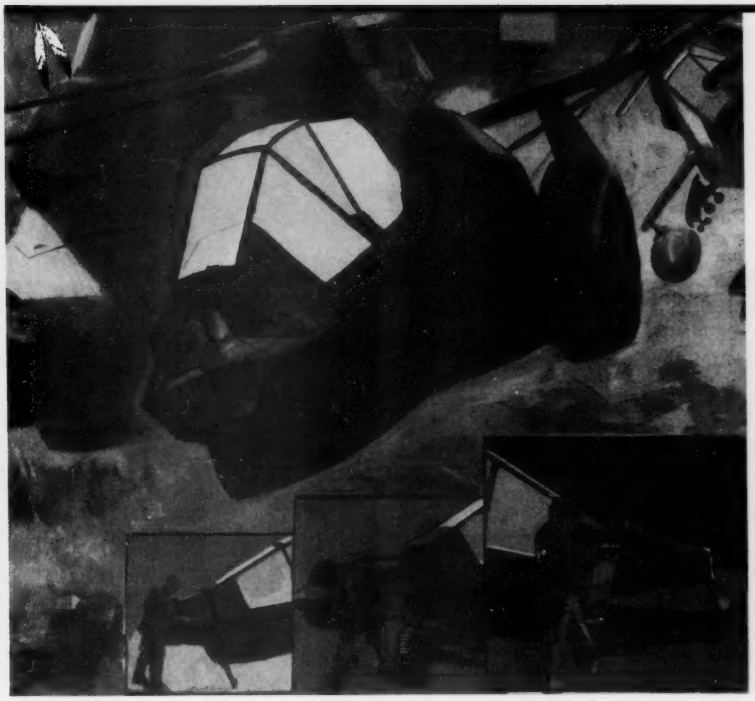


FIGURE 2: Objectives

- Maximize MANPRINT, operational, maintenance, and supportability influence of design.
- Expedite information flow.
- Provide daily interface with contractor personnel.
- Prevent, eliminate, and report MANPRINT issues.
- Monitor and track user issues with design.

the Army's goal; they focus on the design phase leading to the first flight of Comanche.

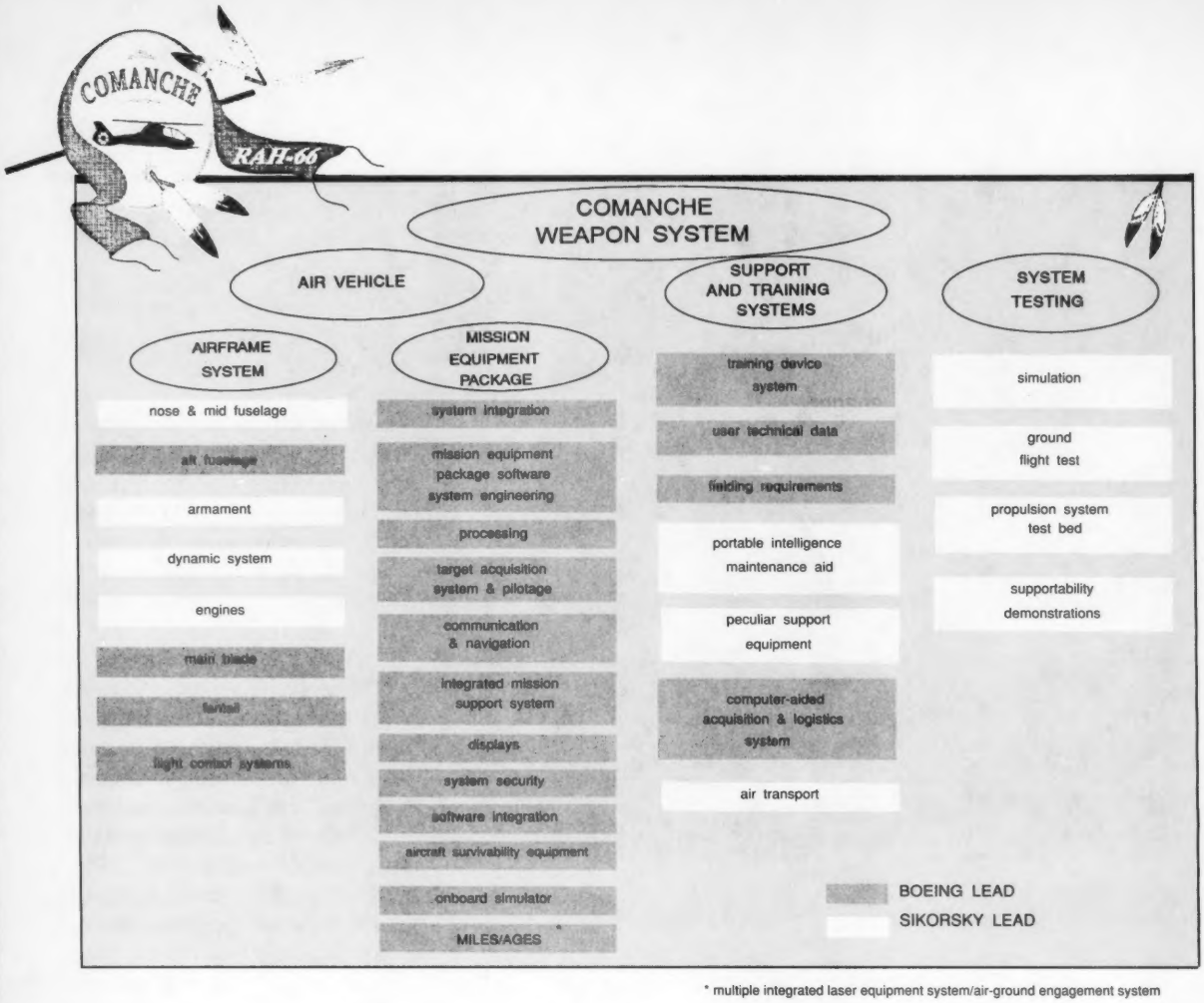
Since our arrival, we have interfaced daily with industry through product development teams (PDTs). These teams are located at both the Sikorsky and Boeing plants. The PDTs consist of representatives from the industry's functional areas such as engineering, manufacturing, design to cost, integrated logistical support, MANPRINT, training, and testing.

This process requires that functional areas work together from the beginning of the design process, as opposed to handing off the design from one functional area to another with relatively little interaction among groups. This approach requires that all functional areas communicate; it provides team members an opportunity to voice concerns and influence design from the very beginning of development.

The Comanche weapons system is divided into four major product areas: airframe system, mission equipment package, support and training systems, and system testing. Numerous PDTs were created to support each of these functional areas. The principal PDTs are shown at figure 3. They are charged with the day-to-day design effort of the Comanche weapons system. The goal of the PDT process is to orient the Comanche design to the end user—our soldiers. Our involvement in the PDTs is the most effective way to provide that orientation and MANPRINT influence.

Working Groups and Advisor Panels

TSM Forward also is a primary member of the Crew Systems Work-



* multiple integrated laser equipment system/air-ground engagement system

FIGURE 3: Product Development Teams

ing Group (CSWG). The CSWG consists of an operator advisory panel and a maintenance and support advisory panel. The operator advisory panel participates in simulation, mockup evaluations, surveys, and analyses of selected aspects of the RAH-66 cockpit and crew station design. The maintenance and support advisory panel participates in maintainability demonstrations, mockup evaluations, and surveys on selected maintainability and servicing of the RAH-66 system design. TSM Forward coordinates the participation of operational aviators and maintainers from the major Army commands in CSWG activities. In addition, we serve as members on the Comanche MANPRINT Joint Working Group and the System Safety Working Group.

Managing MANPRINT Concerns

During the evaluation process, TSM Comanche established a user database to assist in tracking operational suitability and MANPRINT concerns. Concerns that merit oversight and attention have been identified across the Army community. Currently, the database encompasses some 160 concerns. Development of the process to manage concerns is depicted at figure 4. Examples of database concerns are as follows:

- Unrestricted accessibility to aircraft systems for maintenance.
- Operationally effective nonline of sight and line of sight communications.
- Optimized forward arming and refueling point operations for com-

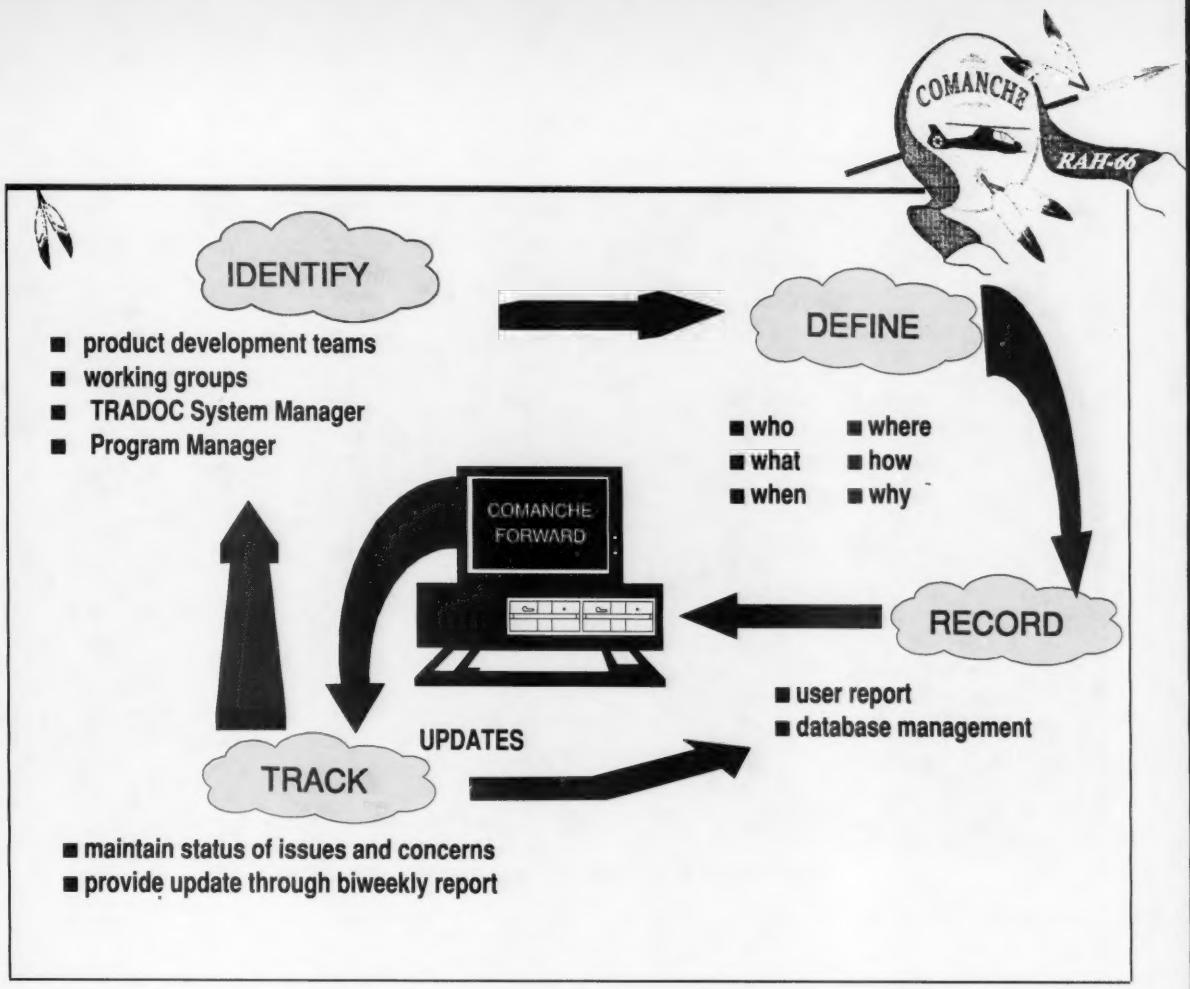


FIGURE 4: Audit trail of issues and concerns

plete refueling and rearming by three personnel in 15 minutes.

The user database is continually updated. In addition, TSM for Comanche is conducting detailed reviews on a semiannual basis. At the completion of our last review, in January 1992, the TSM published a user databook listing the operational suitability and MANPRINT concerns. This publication was sent to all Comanche team members and is available at TSM for Comanche. The document was developed to assist the Comanche community in tracking the Comanche design evolution from the user's perspective.

Summary

The TSM Forward initiative is working well and has benefitted industry, the PM, and the user community. The First Team has continuous access to personnel who can answer questions or obtain the answer about how Army Aviation fights and sustains itself. TSM Forward expedites the flow of accurate and up-to-date operational information to the contractor; it provides the operators and maintainers to assist and interface with design engineers.

For the user community, TSM Forward provides MANPRINT and operational inputs early in the Comanche developmental process and reports progress to the TSM and PM. We are the onsite eyes and ears of the soldier, ensuring the warfighter gets an operationally effective weapon system. TSM for Comanche is, "The Voice of the Soldier."

Comanche Early Operational Capability Unit (1988)

Comanche Early Operational Capability Unit

Major Steven L. Ochsner
Assistant TSM—Training
TRADOC System Manager for Comanche
Fort Rucker, AL

OPERATIONAL testing assures the soldier that the equipment he will be getting can perform on the battlefield and meet mission requirements. For testing to be meaningful, however, the soldier must be fully prepared to operate the equipment on the battlefield. With the RAH-66 Comanche, the soldier takes part in the weapons system design; he determines how best to use its capabilities under an innovative concept called the Comanche early operational capability (EOC) unit.

Training

Training of soldiers who take part in operational testing is considered by some to be a two-edged sword. On the one hand, soldiers must have a thorough understanding of how to

operate and fight the weapons system. Conversely, soldiers must not be taught the test. Additionally, many times in the past, pretest training has been limited to individual training. As a result, the test unit could not effectively and tactically employ the weapons system at the unit level.

Therefore, in 1985, the Vice Chief of Staff of the Army directed that all major systems would have EOC units located at the proponent school. The EOC units would develop tactics, techniques, and procedures (TTPs) before initial operational test and evaluation (IOT&E) on the system. The commander, U.S. Army Training and Doctrine Command (TRADOC), Fort Monroe, VA, in 1988 approved tables of distribution and allowances (TDA) that allocated personnel spaces for the Comanche EOC unit.

Organization and Functions

In 1990, the commanding general, U.S. Army Aviation Warfighting Center, Fort Rucker, AL, directed that the EOC unit would be a TDA air cavalry troop attached to the 2d Battalion, 229th (2/229th) Aviation Regiment. Given this guidance, the EOC was organized to accomplish the following functions:

- Assemble a group of soldiers, tactically proficient in armed reconnaissance, to develop Comanche TTPs and conduct aviation tests.
- Provide industry a repository of operational expertise on site at the factory and at the schoolhouse; address such critical issues as man and machine interface in the design, employment, and training as the weapons system is developed.
- Bring a stronger operational focus to the user testing of the weapons system.
- Become the Comanche initial operational capability (IOC) unit, the first unit equipped with the Comanche and capable of fighting with the weapons system and going to war.

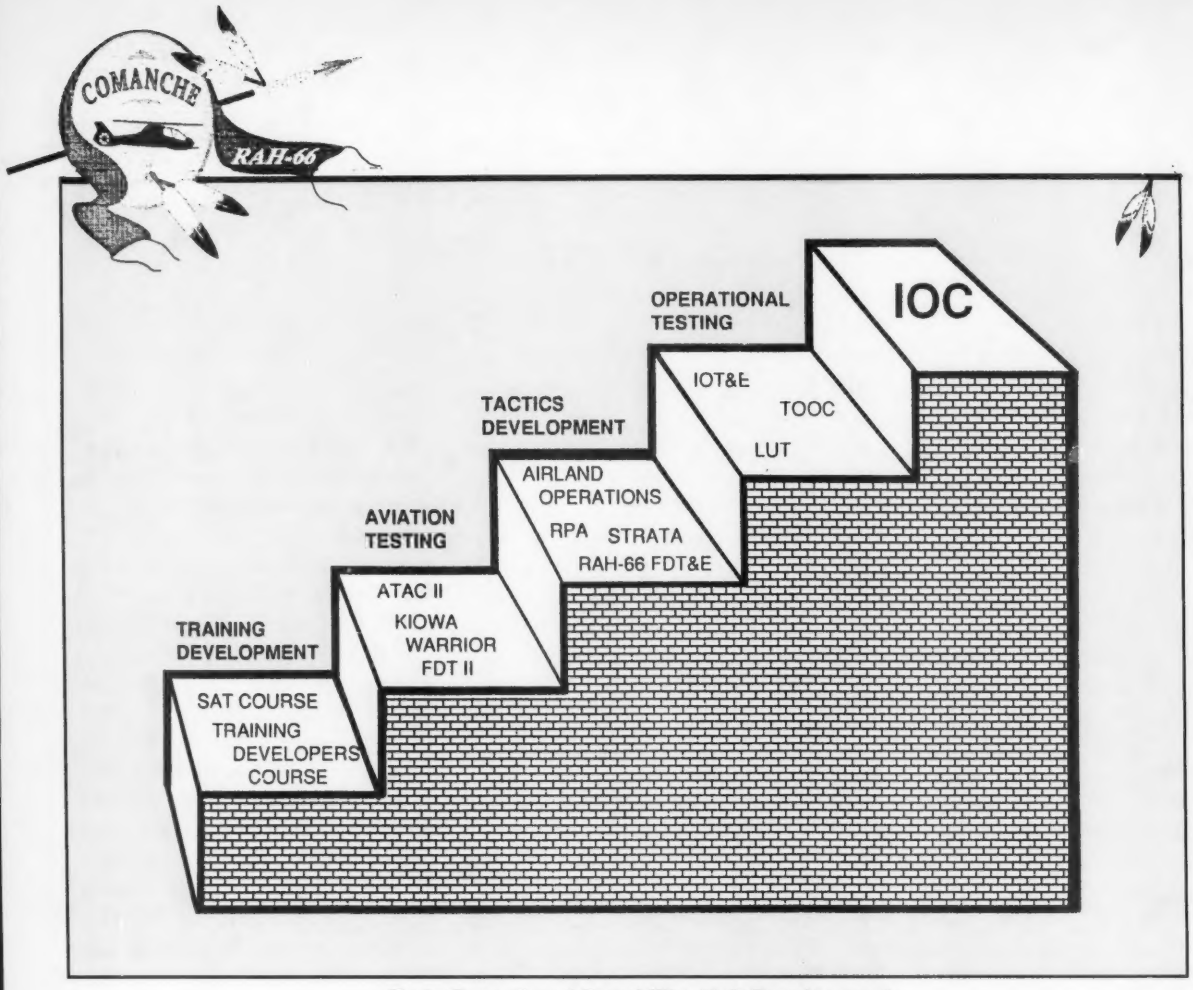
The warning order served as the basis to form the EOC unit. Mission orders followed in rapid succession. The Comanche EOC unit will be the test unit for the Kiowa Warrior (OH-58D) Force Development Test II (FDT II). EOC pilots will be heavily involved in the conduct of the Air-to-Air Combat (ATAC) Test II. EOC pilots have been asked to take part in several aviation simulation tests and demonstrations that truly represent the leading edge of technology.

Methodology

Developing TTPs and posturing a new aviation unit to go to war are a tall order. Soldiers assigned this mission must be highly trained in broad and diverse subjects. They must be well versed in current and evolving warfighting doctrine; have a firm grasp on the capabilities, and limitations, of simulation as a combat developer's tool; and be experienced, and capable, in the fine art of operational and force development testing. Finally, they must be Aviation's leading experts in the capabilities the Comanche brings to the battlefield.

To these ends, the trainup for these soldiers is programmed to develop the unit into a well-honed warfighting team (see figure next page). EOC soldiers have received extensive classes on current and emerging doctrine and scout and attack TTPs from both the Directorate of Combat Developments (DCD) and the Department of Simulation (DOS) at the Aviation Warfighting Center. They are on distribution for, and maintain a library on, everything written on Aviation's role on the battlefield. They have been trained on, and have worked with the advanced aviation mission simulator at the Crew Station Research and Development Facility (CSRDF), National Aeronautics and Space Administration (NASA) Ames, Moffett Field, CA. They take part in state-of-the-art simulation programs such as the Rotorcraft Pilot Associate (RPA) program; the U.S. Army Research Institute (ARI) Simulation Training Research Advanced Testbed for Aviation (STRATA); the First Team Co- manche engineering simulator; and the generic rotary-wing devices at the Fort Rucker Aviation Testbed Facility. EOC soldiers have attended the Test Officer Orientation Course (TOOC) at the U.S. Army Test and Experimentation Command (TEXCOM), Fort Hood, TX; and they are writing the test plans that will be used in Comanche testing. They have studied extensively the design and capabilities of the Comanche to address its most effective tactical employment.

Unit members are being assigned to Fort Rucker from aviation units worldwide. The EOC unit presently is assigned to the office of the TRADOC System Manager for



Early Operational Capability Unit Development

Comanche (TSM-C). It will be attached to the 2/229th as an air cavalry troop in September 1992.

Utilization

The EOC unit presently is task organized along three diverse functions. Major (MAJ) Mike Rusho discusses the first in his article, "TRADOC System Manager for Comanche—Forward: Working for Our Soldiers," on page 43. MAJ Rusho mentions that he has two warrant officers and a senior noncommissioned officer (NCO) assigned with him at the First Team facility in Stratford, CT. These soldiers will remain at the factory as long as needed. They will ultimately return to the 2/229th to provide staff interface between the battalion and the EOC unit.

The second function is training development. For the first time, the aircraft prime contractor will develop the entire training system. The Directorate of Training and Doctrine (DOTD), at both the U.S. Army Aviation School and the U.S. Army Aviation Logistics School, Fort Rucker, AL, and Fort Eustis, VA, respectively, will monitor training development to assure compliance with the TRADOC Systems Approach to Training (SAT).

One flight platoon of the EOC will assist in this process and be onhand to assess the effectiveness of the training. The aviators assigned to this platoon have extensive instructor pilot experience at the schoolhouse and in the field. The assigned NCOs specialize in aircraft armament, avionics, electrical, structures, and mechanic duties; they have had extensive experience working on the AH-64 Apache and/or the Kiowa Warrior. They have attended TRADOC training development schools and are working with DOTD at the Aviation Warfighting Center. In addition, the NCOs interface with design engineers and training developers who conduct the front end analysis on the Integrated Training System.

The First Team training approach that I described in "Comanche: Training for the 21st Century," in the May/June 1991 issue of the ***U.S. Army Aviation Digest***, is innovative. Extensive use of flight simulation replaces aircraft hours. Team trainers bring collective and combined arms training into the schoolhouse. Maintainers are trained on electronic, interactive, training devices instead of actual aircraft. The approach is far less costly. Soldiers of the EOC will be there every step of the way to determine if the approach is effective.

The third function of the EOC focuses on tactical development. The second flight platoon will form TTPs in a series of force development test and experimentations (FDT&Es) to be conducted in the Aviation Testbed Facility, which is the FDT&E platform. Through a series of planned enhancements, the facility will replicate Comanche capabilities in force-on-force, combined arms exercises.

Developing, testing, and refining TTPs at the Aviation Testbed Facility this early in the program provide several significant advantages over predecessor programs. First, these functions offer the chance to experiment with TTPs under the umbrella of the emerging doctrine of AirLand Battle and AirLand Operations. Second, they allow exploration of the role armed reconnaissance plays on the battlefield. Third, they provide a platform for man-in-the-loop simulations to support future cost and operational effectiveness analyses.

Most important, they allow examination and refinement of tactical scenarios for use in aircraft operational testing. Thus, they create a chance for extensive testing and data gathering at a fraction of the cost of conducting FDT&Es of actual aircraft. As an added bonus, the synergistic effect of combining the Comanche and the Aviation Testbed Facility resources and technologies provides the Aviation Warfighting Center with a first-class test platform. The Center might not have otherwise been able to develop this platform.

Development of Comanche TTPs goes far beyond the EOC. It is truly an Army Aviation effort. Representatives of TSM-C; Headquarters, TRADOC; TEXCOM; the U.S. Army Operational Evaluation Command; the Deputy Chief of Staff for Operations and Plans; the Program Manager for Comanche; and DCD, DOTD, and DOS meet on a regular basis as an FDT&E working group to review the efforts of the EOC. In addition, periodic councils (colonels) provide guidance and senior management review.

Besides activities at the Aviation Testbed Facility, this platoon also is involved with the First Team man and machine interface design effort. The platoon and five aviators from the U.S. Army Forces Command, Fort McPherson, GA, provide user input and serve as test subjects in engineering simulator evaluations. They garner manpower and personnel integration and system performance data. Several pilots from this group will be the first Army pilots to fly the prototype Comanche during the prototype assessment phase. In this phase, and later in the limited user test (LUT), these pilots will apply the TTPs developed at the Aviation Testbed Facility to the operation of the actual aircraft.

The EOC contribution to Army Aviation extends beyond the Comanche program. As stated earlier, ARI's STRATA program and the RPA program have recognized the value of having highly experienced operational aviators. These aviators have been extensively trained in current doctrine, advanced aviation simulation, and operational test procedures. These programs have asked for, and used, EOC pilots in their development programs. Also, EOC pilots will take part in the ATAC Test II scheduled for 1992. The EOC also will be the test unit for the Kiowa Warrior FDT II. The unit will receive eight Kiowa Warriors in February 1993; individual aviator and maintainer training is now ongoing. In the third quarter of fiscal year 1993, the unit will receive U.S. Army Aviation System Command, St. Louis, MO, new equipment training. The unit will then undergo collective training with the Apache Training Brigade to prepare for the 1994 test.

Status

The Comanche EOC is an evolutionary concept that will maximize the effectiveness of a new weapons system at IOC. The soldier, who knows the training requirement, is a full partner in the development of training. The soldier, who knows the mission, determines how to use the enhanced technology and writes the tactics. In partnership with the operational tester, the soldier drafts the test plan and conducts the test. In this way, the Comanche EOC is building a legacy of professionalism as the soldier, the user, takes part in development and testing of the weapon system. Army major weapons system acquisition will never be the same.

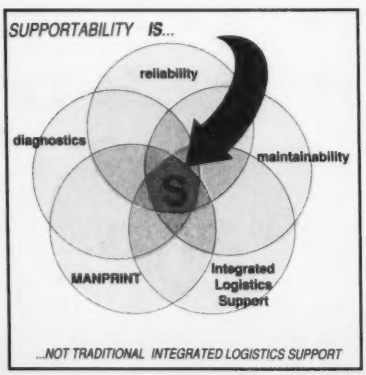
Supportability

The ability that sustains Comanche's combat effectiveness

Chief Warrant Officer (CW4) Robert C. Schmidt
Assistant TSM—Supportability/Logistics
TRADOC System Manager for Comanche
Fort Rucker, AL

What does support**ability** have to do with performing an armed reconnaissance mission or with Army Aviation in general? Supportability, or the lack of it, can mean the difference between success or failure in the AirLand Battle. This article addresses supportability and why we need it?

FIGURE 1: Five disciplines of supportability



Integrated Logistics Support

Until recently, Army materiel acquisition system personnel have considered supportability as integrated logistics support (ILS). Logistics is the military science of procuring, maintaining, and transporting materiel, facilities, and personnel.

As an aviator, my definition of ILS was an instrument landing system. In 1988, I was reassigned to the U.S. Army Logistics Center (now the Combined Arms Support Command), Fort Lee, VA. I thought I was to be a materiel requirements staff officer involved with the acquisition and fielding of a new instrument landing system. Then, I found out ILS had an entirely different meaning. Even then, supportability was viewed as a subset of ILS.

Supportability (figure 1) relates to the ability of a weapons system to be operated and maintained at required readiness levels within established cost thresholds. It is the degree to which design is incorporated into an air vehicle or weapons system to provide operational suit**ability** for specified combat missions. Supportability is *not* traditional ILS. Supportability is made up of five disciplines. The area where the five circles intersect illustrates the overall integration of these disciplines. This is supportability. If we decrease the emphasis in any one of these areas, the circle becomes smaller and the intersecting area for supportability decreases or disappears. Conversely, if we increase emphasis, we achieve more supportability, but only up to the point where one circle reaches the intersection of two other circles.

ILS is made up of 12 elements:

- *Design influence.* The ultimate goal of all efforts early in the design process.
- *Maintenance planning.* Unique to the Comanche program is the two task-level maintenance concept: User and depot. Comanche will be the first

major weapons system fielded under such a concept. The Comanche will still be supported by the traditional three-level, aviation supply system.

■ *Manpower and personnel.* The Comanche is designed to be less maintenance manpower intensive, which will increase productivity and may allow for some military occupational speciality (MOS) consolidation.

■ *Supply support.* Three-level supply.

■ *Support equipment and test, measurement, and diagnostic equipment.* The goal of the Comanche program is to eliminate or minimize support equipment requirements by the design process.

■ *Training and training devices.* When the Comanche is fielded, its integrated training system will be fielded at the same time.

■ *Technical data.* The Comanche is a spearhead program to implement the computer-aided acquisition and logistics system.

■ *Computer resources support.* The Comanche has built-in processing power and interfaces with the unit level logistics system—Aviation. The Comanche has an automated aircraft logbook and interfaces with the Army retail logistics system.

■ *Packaging, handling, and storing.* Comanche items, such as repair parts and line replaceable units and modules, will be packaged in reusable shipping and storage containers. Existing containers will be used when possible.

■ *Transportation and transportability.* The Comanche is designed for unloading from a C-130 Hercules in 22 minutes, using eight people.

■ *Facilities.* The Comanche will have a full combat mission simulation system.

■ *Standardization and interoperability.* The Comanche will be compatible with North Atlantic Treaty Organization forces standardization agreements and with American, British, Canadian, and Australian forces.

Supportability supersedes these elements, even though they appear to be pretty encompassing. The logistician pays particular attention to these elements. The requirements for each of these elements help influence the weapon system's design. Their integration gives real meaning to the term ILS.

Manpower and Personnel Integration (MANPRINT)

Six domains of MANPRINT are:

■ *Manpower.* How many soldiers does the system require?

■ *Personnel.* Which MOSs and skills are required?

■ *Training.* How do we train soldiers?

■ *Human factors.* Is the system designed to fit the soldiers who will use it?

■ *Health hazards.* What about the system that can harm soldiers?

■ *System safety.* Is the system safe for soldiers to use?

The system MANPRINT manager needs to ask himself this simple question: "Can these soldiers, with this training, using these tools, under these conditions, maintain this system up to standards, safely?" If he can answer yes, MANPRINT has positively influenced design.

Reliability, Availability, and Maintainability (RAM) Engineering

Reliability. Engineers calculate the hardware reliability of the Comanche. They base their calculations on available technology and the operational requirements document (ORD) for the weapons system. Their calculations become the RAM rationale annex of the ORD. They calculate items such as mean-time-between-mission-affecting-failures (MTBMAF), mean-time-between-unscheduled-maintenance-actions,and mean-time-between-essential-maintenance-actions. The Comanche has some aggressive reliability numbers. For instance, the MTBMAF should be greater than 9.8 hours by the end of the RAM validation period, which is 2 years after initial fielding.

Maintainability. Engineers determine numbers for items such as the maintenance ratio (MR) in terms of maintenance man-hours per flight hour. Comanche should achieve an MR of 2.6 hours per flight hour by the end of the RAM validation period. Engineers also determine mean-time-to-repair (MTTR), maximum-time-to-repair for battle damage assessment and repair, and component accessibility time. To have quick and easy accessibility requires that supportability influence its design. Proper emphasis placed on a system meeting its RAM requirements ultimately reduces the user's cost of ownership (parts, fuel, maintenance man-hours, and down time).

Integrated Diagnostics/Prognostics

One of the most exciting things to emerge from the Comanche design efforts is the use of fully integrated electronic fault diagnostics, isolation, and prognostics. Figure 2 shows the numerous advantages gained from the use of integrated diagnostics.

Imagine this scenario. A team of Comanches assigned to an air cavalry troop returns from an armed reconnaissance mission. On shutdown the op-

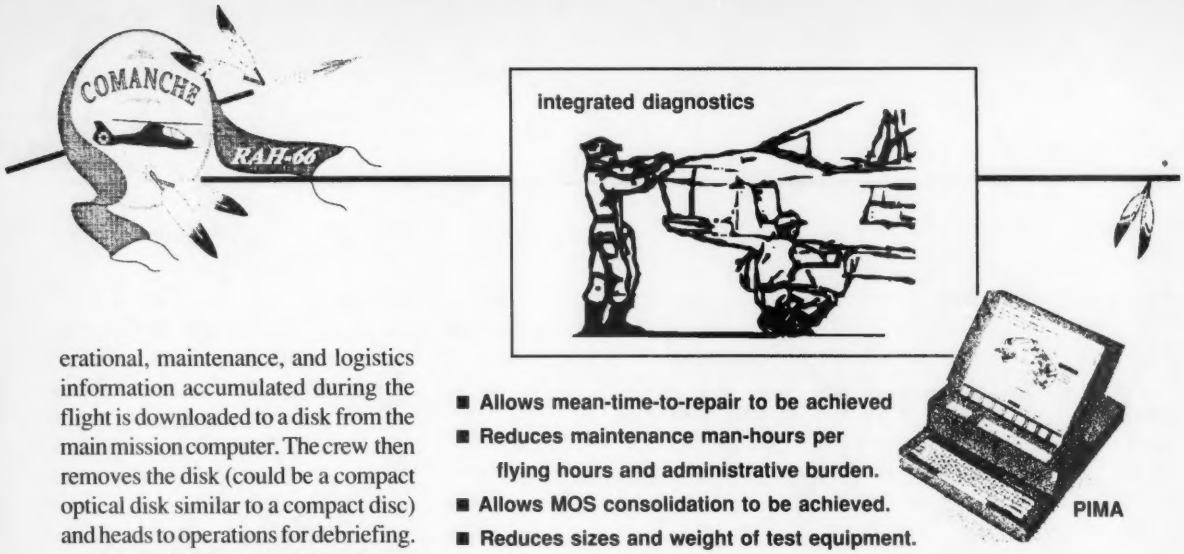

COMANCHE
RAH-66
integrated diagnostics
■ Allows mean-time-to-repair to be achieved
■ Reduces maintenance man-hours per flying hours and administrative burden.
■ Allows MOS consolidation to be achieved.
■ Reduces sizes and weight of test equipment.
PIMA

FIGURE 2: Advantages of integrated diagnostics

erational, maintenance, and logistics information accumulated during the flight is downloaded to a disk from the main mission computer. The crew then removes the disk (could be a compact optical disk similar to a compact disc) and heads to operations for debriefing.

Meanwhile, the crewchief arrives at the aircraft with his portable intelligent maintenance aid (PIMA), similar to a lightweight lap-top computer. He opens the aircraft's electronics bay (E-bay), removes the maintenance data cartridge, plugs it into his PIMA, and proceeds to read the logbook. Or he could plug directly into the aircraft through the 1553-B databus interface. Faults were automatically written to the data cartridge during shutdown.

He sees that he has to perform some maintenance tasks to return the aircraft to full mission capability, and presses a couple of buttons. The PIMA displays the tasks necessary to correct the deficiency, to include the necessary graphics to accomplish the task. He repairs at the user level by replacing faulty line replaceable modules. Access is easy. Because of supportability's influence on the design process, he does not have to remove any good components to replace bad ones.

After he finishes, he "signs" off the logbook corrective action on the PIMA. The aircraft logbook is electronically updated; he removes the cartridge from the PIMA; and he reinserts the cartridge into the E-bay. The Comanche is now mission-ready.

All electronic data, logbooks, and prognostic information will be archived in the technical inspector shop. Requests for parts will be generated automatically as will aircraft status reports. The maintainer's tasks are now simple, quick, and easy to understand.

Many of these disciplines crossover into each other and may seem like similar tasks. In reality, they are doing different tasks. We need supportability to maintain an operationally suitable and cost-effective balance among these disciplines that influence design. Apparent duplication of effort serves as a cross-check of the other disciplines.

Integration is the greatest of all tasks. The Comanche team (industry, the Program Manager (PM), and the TRADOC System Manager (TSM) for Comanche) integrates the subsystems of the RAH-66 Comanche into a weapons system that has inherent deploy**ability**, surviv**ability**, and sustain**ability**. The subsystems have supportability managers with tough jobs. The managers must know the total weapons system, from engineering to cost account**ability**, and must be proactive in the design process. They must identify and solve issues that hinder the weapons system's supportability.

The user fits into the supportability and design process through the TSM for Comanche—Forward initiative. (Note: "TSM for Comanche—Forward Working for our Soldiers" article by Major Mike Rusho, page 43). Although it does not effect contract changes, the TSM for Comanche—Forward influences supportability and crew station design. As an integral member of the Comanche team, TSM for Comanche—Forward provides additional interface among industry, the PM's office, and the user.

Conclusions

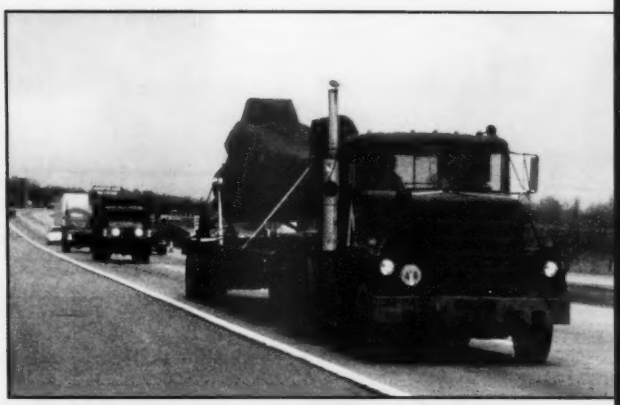
After reading this article, can you identify the number of different "**abilities**" associated with the development, manufacturing, and fielding of a new weapons system? There are 12. I have grouped them together under supportability to illustrate the detailed integration effort that must take place to provide the soldier the capabilities required to eliminate current battlefield deficiencies. Added together, they provide the substance that makes supportability.

When supportability is properly applied to influence the design of a weapons system, the result is a totally integrated, combat effective, and operationally suitable system capable of meeting the warfighters' mission requirements. TSM for Comanche—Forward, by representing the user's interest, will ensure our soldiers have the means to meet the supportability challenges of the 21st century. "TSM for Comanche—Voice of the Soldier."

COMANCHE DEPLOYS

To The Aviation Warfighting Center

Sergeant First Class Douglas Wriston
Assistant TSM—T800
TRADOC System Manager for Comanche
Fort Rucker, AL



The Comanche mockup leaves Philadelphia...

THE RAH-66 Comanche provides the Army with a much needed capability—rapid deployment—in support of force projection from continental United States and forward-based forces. On 4 April 1992, the RAH-66 demonstrated the rapid deployment requirement by C-130 Hercules air transport. This made the tactical deployment from Philadelphia, PA, to the U.S. Army Aviation Warfighting Center, Fort Rucker, AL, possible. The Boeing Sikorsky Joint Program Office donated the full-scale mockup to the U.S. Army Aviation Museum. The Army's job was to get the RAH-66 Comanche mockup to Fort Rucker.

Moving the mockup provided an excellent opportunity to evaluate the tactical transport of the Comanche in U.S. Air Force C-130 aircraft and ground transport by Army tractor-trailers. Air transportability requirements call for the Comanche to be transported by a C-130, debarked, and ready to fight within 22 minutes, using a crew of eight. The requirement for tactical aircraft recovery is met either by slingloading from medium lift helicopters or by ground transport with Army trailers. A joint team of units from the Active Army, Reserve Component, and the U.S. Air Force Reserve conducted the air and ground transportability demonstration.

The eight personnel who performed the tactical embark and debark operations are assigned to the Comanche early operational capability unit at the Aviation Warfighting Center. The soldiers spent several days at

...debarking at Cairns Army Airfield...

...installing main rotor hub shroud...

...installing main rotor blades...

the Boeing Helicopter plant in Philadelphia, PA, learning and then refining the procedures for loading, tying down, unloading, and reassembling the mockup. Representatives from Boeing Sikorsky used the opportunity to compare their designed transportability procedures to crew drills that soldiers developed. Then the show began.

The mission was conducted in three phases. During phase I, the mockup was loaded on an M-270 semitrailer (low-bed, 12-ton) from the 154th Transportation Battalion (Bn), Pennsylvania Army National Guard. Then the mockup was transported to the municipal airport at Wilmington, DE. After reaching the airport, the mockup was off loaded and configured for transport. A C-130 from the 357th Tactical Airlift Squadron, U.S. Air Force Reserve, Maxwell Air Force Base, AL, landed; the mockup was loaded; and phase II of the mission began—air transport to Fort Rucker.

The C-130 touched down at Cairns Army Airfield (CAAF) and taxied to the edge of the tarmac. The debarkation evaluation began. After all, the real combat test is how quickly the unit can debark the Comanche and be ready to fight. In essence, deployability is how rapidly one can join the fight. The full-scale mockup is representative in size, weight, and configuration of the RAH-66 Comanche. Camera crews started filming and stopwatch functions on wristwatches were activated as the ramp on the C-130 was lowered.

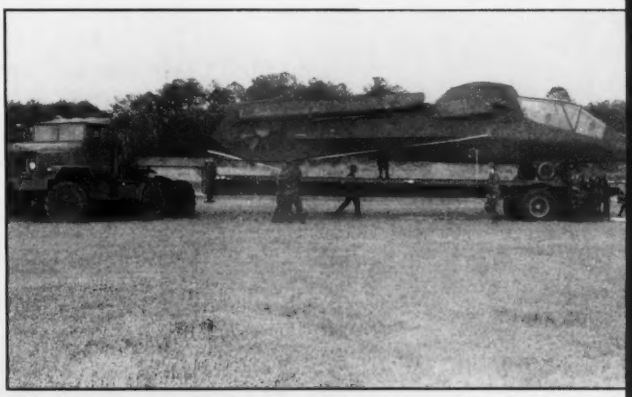
The mockup was debarked tail first, with one soldier using a ground handling tow bar to provide steering to the tail wheel. Main landing gear struts were retracted and extended, as necessary, to maintain top and bottom clearances as the mockup exited the C-130. Once on the ground, the mockup was pushed away from the C-130. As the crew began to assemble the mockup, the Air Force transport repositioned for takeoff. Minutes after touchdown the cargo aircraft was released to perform other missions in support of the deployment of forces.

Four soldiers climbed on top of the mockup, using the built-in maintenance work areas. Standing on the aft fuselage (another maintenance work area), one soldier began installing the vertical fin while three others retrieved the first main rotor blade from the saddle bag blade rack, which set atop the aft fuselage during transport, and attached the blade to the rotor hub. In the meantime, two other soldiers installed the turreted 20mm gun system; the seventh soldier removed the ground handling equipment; and the eighth person helped position the horizontal stabilizer. After the vertical fin was installed, a fourth person joined the blade crew. By the time the tail section was reassembled, the mockup was ready to join the fight. Elapsed time was 11 minutes and 15 seconds, well within the requirement of 22 minutes.

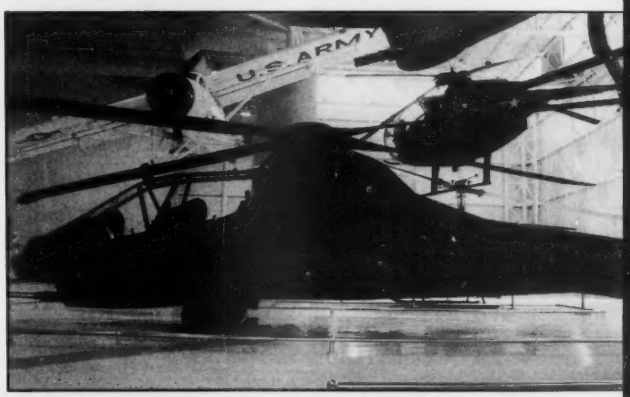
Instead of joining the fight, however, the mockup would become part of the fleet at the Aviation Museum. Phase III required another M-270 low-bed trailer ride from CAAF to the museum at Fort Rucker. The 46th Engineer Bn, Fort Rucker, provided the ground tactical transport, and Company F, 214th Aviation Regiment, provided the M-270 low-bed trailer. The expertise of unit members in ground transport was readily apparent as the trailer was backed into position adjacent to the mockup. The wrecker winch was extended and, within minutes, the mockup was once again sitting on a trailer, blades removed and stowed, and ready to travel.

The mockup displayed in the museum bridges the future with the past and present, and updates the story of Army Aviation. Not only did we get a worthy addition to the museum, we also took the opportunity to evaluate the air and ground transportability attributes. Until such time as the Comanche actually flies in the skies over Fort Rucker and other areas, you will be able to see the mockup at the Aviation Museum—thanks to the Boeing Sikorsky Program Office and the efforts of the joint Army and Air Force tactical transport team.

...assembled in 11 minutes...



...disassembled to transport...

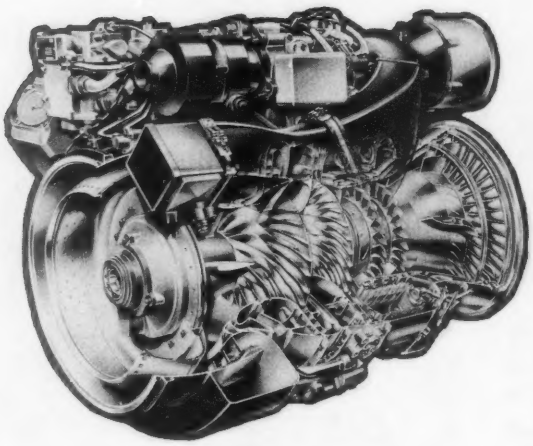


...and displayed at the Army Aviation Museum.

T800 ENGINE Update

USERS AT WORK

Sergeant First Class Douglas Wriston
Assistant TSM—T800
TRADOC System Manager for Comanche
Fort Rucker, AL



A BRIEF REVIEW of the T800 Engine Acquisition Program shows the T800 engine is an acquisition success for the U.S. Army. In 1984, the Army requested proposals for a new turbine engine. Proposals were received from Lycoming/Pratt and Whitney, General Electric/Williams, and Garrett/Allison. In 1985, Lycoming/Pratt and Whitney and Garrett/Allison were selected to continue development of the engine. The competition during full-scale development concluded in 1988. At that time the team of Garrett/Allison was selected to develop the T800 engine (figure 1) under the name of the Light Helicopter Turbine Engine Company (LHTEC).

Maintenance

From the beginning, soldiers have had input into every aspect of development of the T800 engine. Supportability (reliability, availability, and maintainability; integrated logistics support; and manpower and personnel integration) comprised 25 percent of the source selection criteria. Maintainability demonstrations (M-DEMOs) were conducted to evaluate how easy, or difficult, it was for Army users to perform maintenance tasks on the engines. Experienced engine maintainers and graduating advanced individual training students performed maintenance on the T800 engine under the close observation of the Army and LHTEC maintainability engineers. Even high school students performed selected maintenance tasks

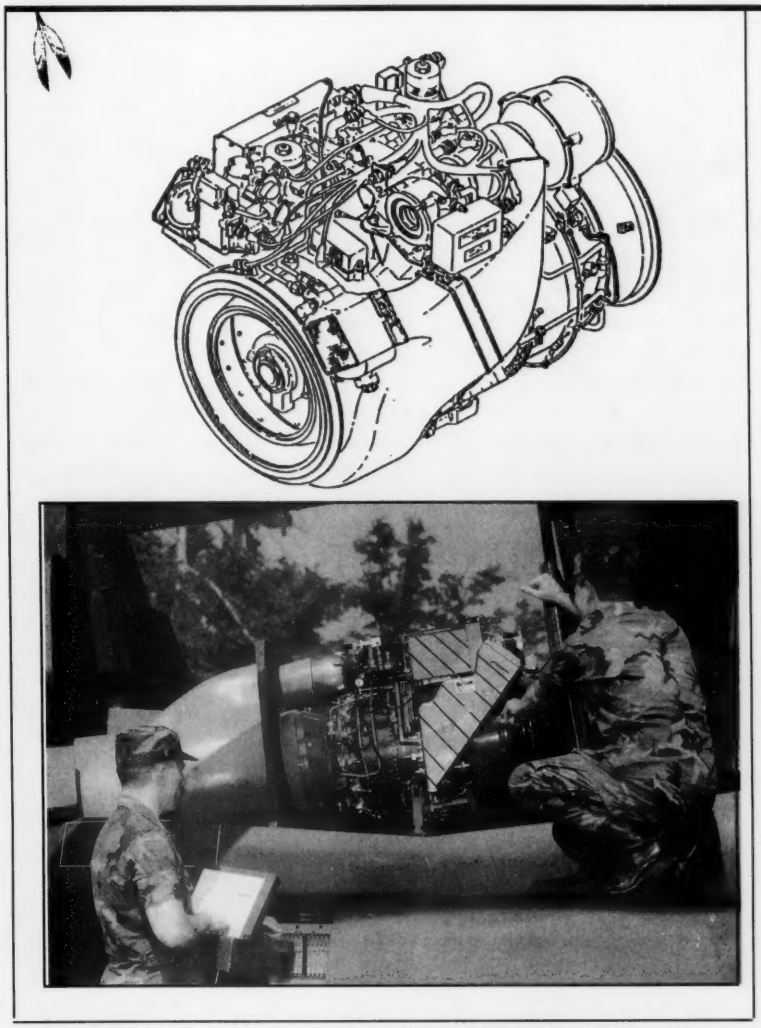


FIGURE 1: The light helicopter turbine T800 turboshaft engine

without difficulty. The information from the M-DEMOs was used to correct, when necessary, maintenance procedures.

Performance and Testing

Maintenance performed on the engine demonstrated that the T800 engine can be easily maintained. But how does it perform? The LHTEC and the Army developed an engine that produces 1,233 continuous shaft horsepower (SHP), yet weighs only 307 pounds. Its 4.5 to 1 power-to-weight ratio has not previously been attained. The LHTEC is committed to operating and supporting warranties for $70 an hour. (This cost is 50 percent less than the Army requirements.) To date, the engine has accumulated over 13,200 actual test hours, making it one of the most thoroughly tested engines the Army has ever purchased.

Most of the testing is performed in the LHTEC engine test cells where engines are abused, heated, and frozen; ice and sand are thrown into the engines; and then they are taken apart to analyze the effects of those actions. However, not all testing is done in the test cells. The LHTEC has the T800 engine in four aircraft. An Augusta 129, a Westland Lynx, an HH-65 Dauphin, and a UH-1 Huey have logged over 400 hours powered by T800 engines.

Training

Perhaps more important than the engine itself is the T800 engine support package the LHTEC has developed for the Army. Not only will we buy an engine in this program, we will buy the verified technical manuals (TMs) and also a complete training program. The TMs are contractor-developed. When 20-, 45-, 70-, and 100-percent complete, they are submitted to Army subject matter experts (SMEs) for review. The SMEs review the TMs, note corrections to be made, and that information is given to the LHTEC, who revises the manuals.

The training program, performed by contract, is being developed in accordance with the systems approach to training, which is the Army's standard method for developing training materials. The Army selected interactive course ware (ICW) as the training delivery media for the T800 en-

gine. The ICW allows a student to work at his or her own pace, and tests retention and mastery as the lesson modules progress.

The LHTEC has developed "proof of concept" courseware, which is compatible with the Army's electronic information delivery system. In August 1991, trainers and traineers evaluated the courseware and found it to be an excellent example of computer- based instruction. The goal of the Army is to ensure we have a valid set of TMs and a quality training program to support the T800 engine when it is delivered.

Efforts by the Army and the LHTEC have produced an engine with fewer parts, fewer tools, and lower costs. The T800 engine is easier to maintain; exhibits longer life; and permits simplified training, which is a vast improvement over most other Army engines. The T800 engine will certainly be one of the most supportable products in Army Aviation.

Application-Integration Process

The first planned Army application of the T800 engine is as the powerplant for the RAH-66 Comanche. The engines will be Government-furnished equipment to the Comanche manufacturer. The commitment of the LHTEC is broader than providing engines.

In April 1991, Boeing Sikorsky (First Team), the LHTEC, and the Army initiated the air vehicle engine integration plan. In this carefully designed plan, both manufacturers agreed to smoothly integrate the T800 engine into the Comanche while ensuring that the positive attributes of the T800 engine were not degraded in any way in the overall integration process.

A one-piece cowling will cover the engines on the Comanche. When the cowl is open, both engines will be completely exposed (figure 2). Total exposure provides ample outboard maintenance platform and walk area, and easy access for Army maintainers for servicing and maintenance.

Maintainability Assessment

In December 1991, Boeing Sikorsky hosted the first Comanche maintainability assessment (figure 3). The full-size Comanche mockup, with two T800 engines installed, was used to conduct the assessment. The objective of the assessment was to perform maintenance tasks on the mockup and evaluate the ease or difficulty Army maintainers encountered.

Four Army maintainers were selected to participate in the assessment based on their various skills and skill levels. The soldiers were experienced in armament, engine, OH-58D Kiowa, and UH-1H maintenance. Their skill levels varied from specialist to staff sergeant rank.

Upon arrival at the Sikorsky facility, the maintainers were greeted by two LHTEC maintainability engineers who provided 2 days of T800 engine training. The soldiers received training and then began to perform 32 maintenance tasks on the T800 engines mounted in the mockup. The First Team, the LHTEC, and the Army selected the tasks based on the level of difficulty. All tasks were performed several times during the assessment. Few problems occurred, primarily because of users' influence during the development of the T800 engine and the close working relationship between the First Team and the LHTEC. Those tasks that presented problems

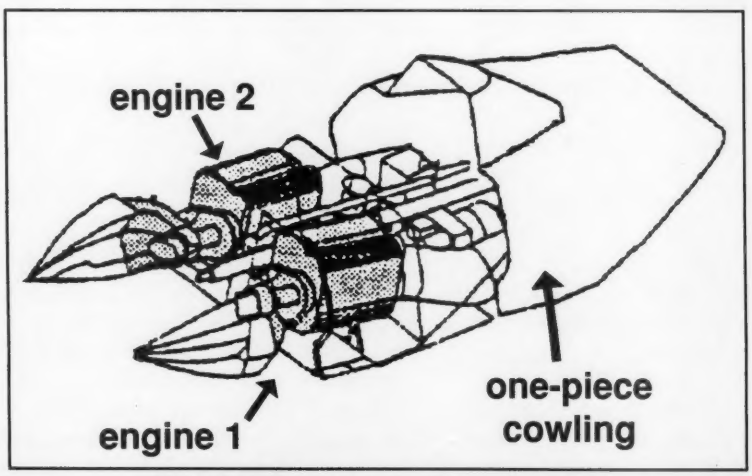


FIGURE 2: One-piece cowling and engines

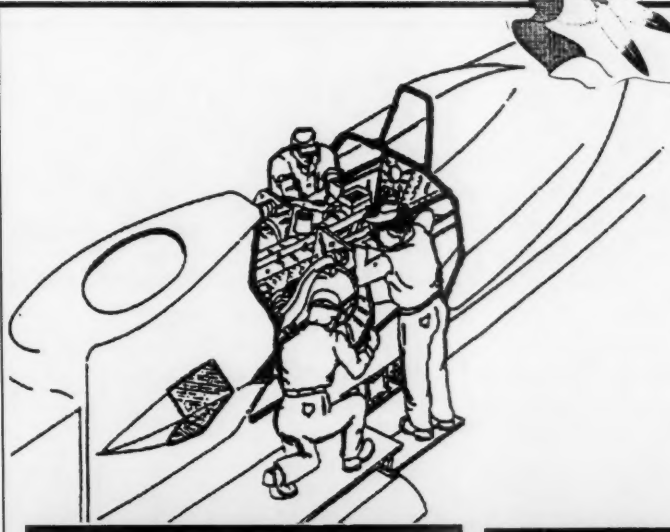


FIGURE 3: Comanche maintenance assessment

were noted and are currently being corrected.

The impact a maintenance assessment can have was positively demonstrated in the T800 engine program. As a result of three T800 M-DEMOs, 56 items affecting design were identified. The Comanche program has committed itself to the same kind of iterative design influence as the T800 engine. As the design matures, Army maintainers will conduct maintainability assessments and surface the areas that need to be improved.

T800 Engine Growth

The most recent event in the T800 engine story occurred in January 1992. After evaluating lessons learned during our three most recent conflicts, Army planners concluded that ballistic protection for crewmembers and aircraft survivability equipment need to be permanent equipment on the Comanche instead of kits. In addition, the Army made the decision to maintain flight performance levels with the Longbow weapons system installed.

To maintain performance requirements with the addition of these new systems, the T800 engine will have to grow by 12 percent. The increase will allow the T800-LHT-800 engine to provide 1,381 continuous SHP instead of the baseline T800 engine 1,233 SHP. This decision does not present any particular problem because the T800 engine is designed to have the capability to grow up to 50 percent in SHP. Some internal changes to the engine allow the T800 engine to grow. The external size of the engine will not change, therefore, the Comanche mounting system and the engine containers will not be affected. The line replaceable units and modules will remain the same, and there will be no change to the aviation unit maintenance procedures or user-level tool kits. The weight of the engine will increase about 10 pounds.

To demonstrate that the T800-LHT-800 engine has grown without adverse effects on supportability, another M-DEMO will be scheduled. Once again, an assortment of Army maintainers will gather with six tools in hand to ensure the LHTEC modifications have not had a negative impact on the maintainability of the engine. When aviators start Comanche engines for the first time, the Army will have a supportable and maintainable product because Army maintainers were involved in every step of the development process.

ALAT

What have you done for me lately?

by Mr. Don L. Hamblin

The success of U.S. Army Aviation Systems Command (AVSCOM) operations during Operation Desert Shield/Desert Storm (ODS)—through proactive initiatives—is history, well known, and envied throughout the Army's logistics community. However, the question, "What have you done for me lately?," must be asked. AVSCOM logisticians did not slow down even as VII Corps units redeployed from the South West Asia (SWA) Theater to their home stations in U.S. Army, Europe (USAREUR).

Aviation Logistics Assistance Team (ALAT)-Turkey

While ODS coalition forces were enjoying their well-deserved triumphs, elements of the USAREUR-based V Corps deployed to Turkey to support relief efforts for Kurdish refugees from northern Iraq. AVSCOM theater aviation materiel program (TAMP) personnel also deployed to Turkey from TAMP King Khalad Military City and TAMP Forward in Dhahran, Saudi Arabia. This team became the ALAT-Turkey.

AVSCOM drew its ALAT members from in-country SWA experts in aviation maintenance management, aviation supply/logistics, and maintenance engineering. The lesson learned in Saudi Arabia, "Wars can't wait for a learning curve," was applied.

The ALAT deployed through USAREUR headquarters to coordinate logistic support plans and establish communications channels with the commander-in-chief's staff. Wholesale and retail operatives now would be dealing with counterparts they knew and trusted.

In Turkey, AVSCOM logistics assistance representatives (LARS) established the best life support structure available for the incoming ALAT. The importance of the intracommand support and relationships lesson also had been learned well in the ***other*** desert.

No More "Box Kickers"

The Combined Task Force in Turkey did not need three more wrench-turning *boxkickers*; therefore, AVSCOM, St. Louis, MO, began to apply the lessons so recently learned. Their 24-hour emergency operations center (EOC) expanded its role to include support for the Turkey ALAT by—

- Establishing daily voice communication between the AVSCOM EOC and the ALAT.
- Implementing the AVSCOM aircraft on the ground program that expedites supply of the critical parts needed to return an aircraft to flyable status.
- Furnishing clamshelter aviation maintenance shelters.
- Placing a priority on shipments of aircraft repair parts and related supplies to Turkey.
- Applying modification kits to aircraft in-country.
- Pushing supply and shipment of high-usage consummables and critical complements.

The aviation soldier's best friend again was waiting for the phone to ring in St. Louis.

Operation Provide Comfort

ALAT-Turkey continued to document and learn from its challenges and mistakes throughout deployment. So,

as Operation Provide Comfort reduced activity, team members redeployed to the continental United States (CONUS).

AVSCOM continues to learn from its experiences to better support deployed aviation forces. AVSCOM immediately began to develop a team of personnel, drawn from existing designated U.S. Army Training and Doctrine Command (TRADOC)/ U.S. Army Materiel Command (AMC) peacetime positions, to act initially as an ALAT for future real world operations and deployments. The ALAT will form the nucleus for command and control as follow-on elements of the theatre aviation support group deploy. When possible, ALAT personnel will be veterans of SWA to shorten any learning curve. Team members will be overseas prepared and qualified. They will maintain a full issue of uniforms and field gear for any possible environment, desert, jungle, or arctic. The team must carry hip-pocket travel orders and be ready to deploy anywhere, worldwide, on an 8-hour notice.

ALAT team members support units in desert training activities and maneuvers at National Training Center, Fort Erwin, CA.

Team personnel skills requirements became evident during each past deployment. The team makeup included an aviation logistics officer, an aviation maintenance warrant officer, an aviation maintenance noncommissioned officer (NCO), an aviation wholesale/retail supply logistics management specialist, an aviation supply NCO, a field aeronautical engineer, an administrative contracting officer, and a team administrative specialist.

The AVSCOM ALAT now has become a reality. Individual military and civilian personnel have been designated for each team position, with a follow-on/backup team that has been alerted. Actions underway continue to acquire tactical vehicles, communication, and life support equipment. AVSCOM assistance can still be depended on.

ALAT is not the only SWA lesson learned that is being applied. Other contingency plans are being developed and implemented within AVSCOM, AMC, and throughout the Army. None of us can be content with past victories. There will always be things to learn from the smallest to the largest successes and disasters. The entire logistics community is ready for ***innovation and improvement*** with everyone being allowed to contribute.

Mr. Hamblin is assigned to the Directorate for Readiness, U.S. Army Aviation Systems Command, St. Louis, MO.

U.S. Army Aviation Systems Command

Readers may address maintenance questions to: Directorate for Maintenance, ATTN: AMSAV-MPED, 4300 Goodfellow Blvd, St. Louis, MO 63120-1798; or call DSN 693-1653 or commercial 314-263-1653.

Enlisted Aviation Personnel Structure Beyond 2000

Army Aviation currently is comprised of two career management fields (CMFs), 27 military occupational specialties (MOSs), and two test MOSs. Two of the MOSs are Reserves only.

This structure will manage about 22,000 aviation enlisted soldiers or about 815 soldiers per MOS, excluding the two test MOSs (67A and 67B). The least populated MOS is 68P (Avionic Repair Supervisor), about 135 sergeants first class. The most populated MOS is 67T (UH-60 Black Hawk Repairer), about 2,840 soldiers. These two populations again exclude the two test MOSs and the two Reserve-only MOSs (67G, Utility Airplane Repairer, and 67X, Heavy Lift Helicopter Repairer).

If include 11 aviation-specific additional skill identifiers (ASIs) and the many skill qualification identifiers, you can begin to understand the magnitude of personnel management associated with enlisted aviation personnel. This article does not focus on assignments, so there is no need to include stabilized tours, overseas rotation, profile limitations, married couples program, units closed to females, exceptional family members, etc. These complications add complexity to the assignments task. This article focuses on the enlisted personnel structure in aviation, but hats off to the assignments personnel at Department of the Army.

Personnel management doctrine and principles have taught us much in the last 20 years. The team concept that we use in the Army, and the Japanese use to build cars, has been in the limelight recently. The concept of specialized jobs is waning. Specialized jobs reduce flexibility in the work force and are not cost effective. These same specialists contribute to a high level of workmanship in their specialty. The smaller the organization, the more flexible its work force must be. Fewer people must do more. Does that statement sound familiar? We are in a massive effort to downsize the Army; we do not want anymore "Task Force Smiths." Since a systematic process is in motion to downsize the Army, it also is an appropriate time to streamline the enlisted personnel structure in Army Aviation.

Work is beginning to further consolidate the Aviation Branch enlisted personnel structure. The consolidation must reduce the quantity of MOSs and ASIs. The new structure must consolidate the two CMFs. While designing this beyond-2000 personnel structure, standards of grade and viable career paths need to be overhauled. It is obvious that some MOSs in Army Aviation have better promotion potential than others. Some quality soldiers may stagnate at a specific rank. This problem is serious because of the revised changes in retention control points.

In redesigning the personnel structure, it is vital to give every quality aviation soldier an equal opportunity to be all he/she can be. This redesign must include an opportunity to advance to the senior enlisted leadership positions—first sergeants and command sergeants major.

The Aviation Proponency Offices at the U.S. Army Aviation Center, Fort Rucker, AL, and the U.S. Army Aviation Logistics School, Fort Eustis, VA, currently are tackling the job. This tremendous effort will take several years to accomplish, but the task has begun.

Aviation Proponency Office

Readers may address matters concerning aviation personnel notes to: Chief, Aviation Proponency Office, ATTN: ATZQ-AP, Fort Rucker, AL 36362-5000; or call DSN 558-5706/2359 or commercial 205-5706/2359.

Aircraft Armament Maintenance Technician Course

by Chief Warrant Officer 4 (CW4) Larry Summers

Leaders and supervisors at all levels in attack helicopter units are responsible for insuring the availability and effectiveness of aircraft armament subsystems. It is, as a minimum, gross negligence to have a gun, rocket, or missile that will not fire for a pilot on a combat mission. The 4D-SQIE Aircraft Armament Maintenance Technician Course (AAMTC) provides commanders with enough trained warrant officers to make sure that the guns will respond to that, often desperate, trigger pull.

Arming helicopters in the U.S. Army was an idea developed in the 1950s and in the early years of our involvement in Vietnam. The first systems consisted of mounting any available conventional weapon, such as the .30-caliber machinegun and 2.75-inch rocket tubes, on existing helicopters. Sighting and fire control systems were not considered then.

In 1963, not long after initial employment of armed UH-1A Iroquois and UH1B in Vietnam, the first aircraft armament repair courses were offered at Aberdeen Proving Ground, MD. Armament training remained there until 1977, when it was transferred to the U.S. Army Transportation School, Fort Eustis, VA.

Warrant officers were in on the initial development of helicopter armament systems and later were trained at Aberdeen. The formal warrant officer training, however, ended in 1974 during the postVietnam personnel and budget cuts. In the late 1970s and early 1980s, attack helicopter unit commanders encountered problems in maintaining increasingly complex helicopter armament subsystems. Commanders' readiness impact statements on missile system and aircraft status reports showed a need to develop competent supervisory personnel for armament shops. The development of a new warrant officer training program in 1981, called the AAMTC, responded to these needs.

The current course is available for aviation maintenance warrant officers (MOS 151A), AH-64 Apache attack helicopter pilots (MOS 152F) and AH-1 Cobra attack helicopter pilots (MOS 152G). Upon completion of the course, a skill qualification indicator of "E" is awarded.

All students attend a 16-academic-day common aviation core. Upon completion, AH-64 students go to the Advanced Attack Helicopter Division of the Department of Attack Helicopter Training for 10 weeks of additional training. AH-1 students remain at AAMTC for 7 additional weeks. At AAMTC, students are offered 118 hours of training in the integrated fire control system, 40 hours in the wing stores/rocket management system, 64 hours in the universal turret system, and 32 hours in the use of boresight assembly ground support equipment. Warrant officers in the AH-64 program are offered additional hours on these systems: multiplex and symbol generator, target acquisition and designation, optical relay tube assembly, pilot night vision sensor, integrated helmet and display sight, 30-millimeter cannon, heliborne laser fire and forget missile, and 2.75-inch rocket.

After completion of this course, warrant officers are qualified to manage aviation intermediate maintenance and aviation unit maintenance (AVUM) armament shops. Most of the aviation maintenance warrant officers who have completed the course are used in table of organization and equipment (TOE) slots to manage armament shops; however, most attack helicopter pilots are not. AH-64 and AH-1 attack helicopter battalions slot their armament-qualified pilots in the line companies. While many of these trained individuals are managing armament shops as an additional duty, many are simply underused. These armament-qualified officers can help line companies by training pilots, overseeing aircraft armament checks during runups, and interfacing between the company and AVUM armament maintenance. They can be more help to their unit by being involved in the day-to-day supervision of armament shop operations.

Historically, pilots managed armament shops. An armament officer can aid the noncommissioned officers in planning operations and provide a different perspective for troubleshooting armament problems. This should take only a few hours of their time, per day. In peacetime most pilots, other than instructor pilots, maintenance pilots, and safety officers are underused. The argument against using pilots for such critical tasks is valid for combat situations, but not in peacetime. Current thinking seems to be returning to the concept of providing enhanced TOE manning for combat. To save money, it seems practical to provide additional armament-qualified warrant officers for combat and use the fully qualified assets on hand during peacetime.

There are other possibilities for improving armament maintenance in the field. Including a substantial block of armament maintenance instruction, particularly in troubleshooting, would be beneficial for personnel in the AH-64 or AH-1 aviation maintenance officer course. The aviation maintenance officer is, however, fully used in the field on other maintenance problems. He realistically could not be expected to do an armament function without additional manning.

The one certainty in the armament repair business is that new and increasingly complex systems will continue to be fielded. In response, armament training must be kept current and the TOEs must be examined periodically for manning and equipment. The armament training program at Fort Eustis is updated continually in response to identified or perceived needs. With proper training and planning our attack pilots will have the confidence needed to get maximum effectiveness with our armament systems.

The Aircraft Armament Maintenance Technician Branch solicits comments and questions from the field. You may telephone the branch at DSN 927-4254 or commercial 804-878-4254. Questions about attending the course should be addressed through your career manager.

CW4 Summers is Chief, Aircraft Armament Maintenance Technician Branch, Aircraft Armament Division, U.S. Army Aviation Logistics School, Fort Eustis, VA.

U.S. Army Aviation Logistics School

Readers may address matters about aviation logistics to: Assistant Commandant, U.S. Army Aviation Logistics School, ATTN: ATSQ-LAC, Fort Eustis, VA 23604-5415.

How Is Your Happy Home?

by Mr. Al Palmer

What is the largest air force in the world? If your answer is the U.S. Army, you probably have some general knowledge of the number of aircraft associated with military aviation. Being a member of the aviation profession means that you are aware of much more than the number of aircraft. You also possess some useful flying skills. However, do you know that this profession requires not only aeronautical abilities and awareness, but the application of leadership and management skills in the air and on the ground? Exercising and fine tuning our skills are especially critical during this period of "build down." While building down, the focus must include a bottom line entitled, "dollars." We must get the most for our dollars in every situation.

You may know the cost of operating a particular aircraft. You also know your mission and how to operate your aircraft. Your perspective, though, is not oriented to the complex issues surrounding the operation of the Army's 9,000 aircraft. Many problems are associated with that effort. Problems raise questions. Questions require answers. Answers come with training, knowledge, and experience. To help expand your awareness of the picture beyond simply flying, this article will place you in the role of an airfield commander—responsible for the overall capabilities of his assigned airfield.

A new airfield commander immediately learns that, while some airfields are highly specialized, most have a common infrastructure—runways, taxiways, aprons, fuel, control towers, maintenance facilities, etc. This infrastructure must be maintained to meet mission assignments. The Army has an infantry land force supported by aviation. To transport our infantry, we rely on Army and Air Force aircraft. Most Air Force aircraft supporting the Army are heavy transport aircraft. They require, among other things, heavy duty runways.

When looking at a runway, a major consideration is its load-bearing capacity. Can it handle mission aircraft? The only way this can be determined is through a runway survey and pavement analysis performed by qualified Corps of Engineers (COE) personnel. Installation engineers (Directorate of Engineering and Housing [DEH]), while providing essential and valued support to our airfields, usually do not have sufficient aviation expertise to evaluate accurately the real condition of a runway. Unfortunately, COE surveys are expensive; therefore, funds must be included in the installation budget process before scheduling a survey.

Where required, surveys must be performed every 5 years. However, installation commanders are reluctant to spend money on something that might look good on the surface. But the true condition of a runway is measured below the surface. The airfield commander is responsible for providing his commander with the guidance needed to make a decision regarding funding priorities. Not all airfields or heliports require regularly scheduled pavement or runway surveys. Army Regulation 95-2, which briefly discusses surveys, is being revised to clarify this requirement and give additional written guidance to commanders. Meanwhile, airfield commanders can contact U.S. Army Aeronautical Services Agency, Alexandria, VA, for assistance in determining COE points of contact and scheduling priorities.

It is a tremendous responsibility to plan the expenditure of large sums of money on aviation assets. It requires knowledge, meticulous planning, and skilled management. We are returning aviation units from overseas to continental United States (CONUS). In the future, mobilization and deployment may originate primarily from CONUS airfields. Airfields must be able to support the deployment.

Airfields must be capable of safely handling the aircraft needed to carry out the mission. An airfield's runway condition is critical; the runway must be maintained properly.

Would you buy a home and not maintain it? Would you fly an aircraft without expert knowledge of its capabilities? Now, airfield commander, how is your "aviation home?" Is your runway as sound as it looks? Is your airfield mission-capable?

Mr. Palmer is assigned to the Aeronautical Information Division, U.S. Army Aeronautical Services Agency, Alexandria, VA.

U.S. Army Aeronautical Services Agency

USAASA invites your questions and comments and may be contacted at DSN 284-7773/7984 or write to: Commander, U.S. Army Aeronautical Services Agency, ATTN: MOAS-AI, Cameron Station, Alexandria, VA 22304-5050.

PEARL'S

The Need for a HEED

The July 1991 issue of *Flightfax* revealed the realities of increased risk associated with overwater flight.

Some aviators think that overwater flight is an increased risk only for single-engine aircraft. They also think the possibility of a multiengine aircraft having to ditch is so remote that the risk is almost nonexistent. However, when you review the information on aircraft ditchings, you will find that most ditchings (military and civilian) are by multiengined aircraft. So, do not be mislead! Some aircraft have more than one engine because it is required. One engine will not provide the necessary power to sustain flight during normal flight/mission requirements; otherwise, the aircraft probably would have been designed as a single-engine.

The Helicopter Emergency Egress Device (HEED) also is known as the "spare air" by the self-contained underwater breathing apparatus (SCUBA) community. It is SCUBA that has been miniaturized and simplified into a single, lightweight, yet rugged, assembly. It has an aluminum alloy cylinder and stainless steel regulator assembly with a polycarbonate mouthpiece. The physical dimensions are 2 inches in diameter by 13 3/8 long. It weighs 1 1/2 pounds when fully charged. It will provide an average underwater breathing time of about 2 minutes, which is more than enough time to egress a submerged helicopter and rise to the surface. The military designation for the HEED is SRU-36/P (Figure 1). Figure 2 shows the SV-2 Life Vest with the SRU-36/P. It is a proven, life-saving device.

The Directorate of Combat Developments, U.S. Army Aviation Center, Fort Rucker, AL, currently is drafting a requirements document for the HEED.

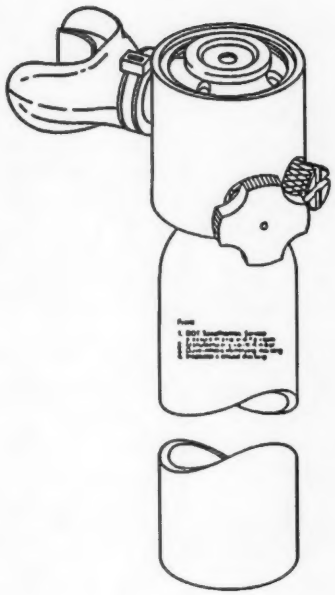


Figure 1. SRU-36/P (HEED)

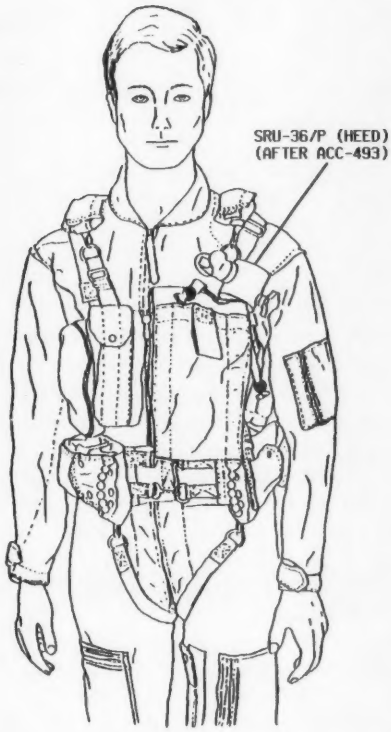


Figure 2. SV-2 Life Vest With SRU-36/P (HEED)

Now Heed the Need

Heed the need for proper training in the use of the helicopter emergency escape device. As any SCUBA diver will tell you, proper training means the difference between life or death in the use of underwater breathing equipment. It is like flight training—you can learn only so much from books. You must receive hands-on training to develop the required level of skill necessary to operate the equipment safely. Anything less than the training now required by the U.S. Navy may result in an air embolism or lung damage (reference Boyle's Law). Untrained or improperly trained use of the HEED is flirting with disaster.

Personal Equipment and Rescue/ survival Lowdown

If you have questions about ALSE or rescue/survival gear, write to AMC Product Management Office, ATTN: AMCPM-ALSE, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798, or call DSN 693-3573 or commercial 314-263-3573.

DES Trends Affect Aviation Medicine

by Major (P) Walton C. Carroll Jr.

For fiscal year (FY) 1992, the aviation branch chief included aviation medicine programs, both clinical and, nonclinical support, in the Directorate of Evaluation and Standardization (DES) Areas of Interest Letter for FY 1992 at the U.S. Army Aviation Center (USAAVNC), Fort Rucker, AL. This addition of the aeromedical programs to the directorate's assistance and assessment programs resulted in lessons learned from the desert operations of Southwest Asia.

The addition of the U.S. Army Aeromedical Center (USAAMC), USAAVNC, has been the "fourth" pillar to the DES assessment team visits. This addition has provided new insights and thus far contributed collateral benefits to unit aviation medicine programs.

Our team flight surgeon support is provided by USAAMC in-house assets. This support has often been a hardship of "robbing Peter to pay Paul" for USAAMC to surge to meet requirements. The benefit, however, has proven to far outweigh the costs. To date, three brigades have been visited and have joined the Aviation Branch to continue its efforts in this aeromedical arena.

The aviation medicine community is excited about this new situation of worldwide feedback to the aeromedical center. Now is the time to look and see if doctrinal support relationships and programs are in place and functioning.

At the beginning of FY 92, the Aviation Branch's goal was to knock off the rough edges of unit programs. As the Branch progressed with the schedule, we see that the challenges and benefits of a functional aviation medicine program far outreach the scope of the original impressions.

A strong program can be instrumental in an improved unit combat-readiness posture. A weak program strains even the best efforts of a unit to achieve a combat-ready posture.

Since the addition of aviation medicine to the Aviation Branch's Areas of Interest Letter, 15 battalion-sized programs have been assessed. These programs range from commendable to bordering on nonexistent. Aviation medicine program effectiveness is currently a function of flight surgeon initiative, availability, and requirements for equipment and personnel.

Please note the word "commander" is omitted in the previous sentence. More often than not, when DES teams questioned aviation commanders and staffs regarding flight surgeon authorization and clinical or nonclinical support effectiveness, they encountered blank stares. Aviation commanders have been willing to "take what they can get" from their aviation medicine program administrators.

In several cases, the DES assessment teams found flight surgeons with primary duties not supporting their aviation medicine program duties, but instead supporting a hospital or non-aviation medicine clinic. The teams found other flight surgeons (assigned against flight surgeon billets) not performing any flight surgeon duties.

In each case, once the problem and requirements surfaced, quick response by the medical community and chain-of-command resolved the shortcomings.

DES team visits concluded that aviation medicine program shortfalls usually, if not always, result from a lack of knowledge by both aviation commanders and supporting medical staffs as to "how things are supposed to work." DES often finds flight surgeons burning the candle at both ends trying to please their customer units and the installation medical community.

Long hours, divergent mission requirements, and just a plain old lack of available time force the decrement of unit aviation medicine programs. Flight surgeons are scrambling to get it all done, being forced to set priorities when resources don't match mission requirements. In the process,

they are defining management by exceptions rather than management by objectives.

Army Regulation (AR) 385-95, paragraph 1-6f; AR 95-3, paragraph 7-1; and AR 40-8 define the flight surgeon's role in unit-level aviation medicine programs. Health Services Command Pamphlet 40-7-25 provides guidance to flight surgeons about administering the aviation medicine program.The new *Guide to Aviation Resources Management for Aircraft Mishap Prevention*, 12th edition, will help commanders assess their aviation medicine program effectiveness.

DES and the Aeromedical Center can answer questions about the aviation medicine programs. Points of contact at Fort Rucker are Captain Mark Evetts, Plans Officer, DES, DSN 558-3504; and Major Milorad Ketchens, M.D., Flight Surgeon, DSN 558-7393.

Major (P) Carroll is Commander, Flight Standardization Division, Directorate of Evaluation and Standardization, Fort Rucker, AL.

Directorate of Evaluation/ Standardization

DES welcomes your inquiries and requests to focus attention on an area of major importance. Write to: Commander, U.S. Army Aviation Center, ATTN: ATZQ-ES, Fort Rucker, AL 36362-5208; or call DSN 558-3504 or commercial 205-255-3504. After duty hours call Fort Rucker Hotline, DSN 558-6487 or commercial 205-255-6487 and leave a message.

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TEXCOM

Testing by Simulation

by Mr. Wayne Hair

Customer satisfaction begins at the drawing board as the U.S. Army Test and Experimentation Command (TEXCOM) pioneers a revolutionary operational testing method for design of a state-of-the-art weapons system.

TEXCOM is combining experimentation, operational testing, development, cost avoidance, simulation, and total quality management for the U.S. Army Infantry Center and Fort Benning, Fort Benning, GA.

The subject of the test is a Line-of-Sight Antitank System (LOSAT) unlike any other antitank system in the world. Officially, LOSAT is a heavy, antiarmor system designed to replace the current Improved TOW (ITV) vehicle.

"LOSAT will consist of a modular weapon system that will be adaptable to the chassis of a selected launcher vehicle such as the Bradley Fighting Vehicle," state test documents.

However, there is no complete system to test. The hypervelocity Kinetic Energy Missile system continues to undergo technical and live-fire tests from a prototype launcher. A design for the fire control system exists, but only a mockup has been constructed.

The manufacturer constructed a mockup simulator of the firing station and controls compatible with the Simulation Network-Development (SIMNET-D) system at the U.S. Army Armor Center and Fort Knox, Fort Knox, KY. Using this mockup connected to SIMNET, TEXCOM testers can collect high-quality data on the development of the LOSAT at a small cost.

ITV crews from the U.S. Armor Center were initially trained on the LOSAT simulator system before test data collection began. During the different phases of the test, the soldiers did standard crew tasks in 60 different events, in many simulated combat scenarios.

"These soldiers are providing the design of the gunner and commander's station as well as the concept for target acquisition," said Floyd Smith, LOSAT test officer, TEXCOM Infantry Test Directorate, Fort Hood, TX. Every move made by the gunner and commander is videotaped and then reviewed by soldiers and testers together in a session with the test team's engineering psychologist, Dr. Jim Geddie, Human Engineering Laboratory Field Office, Fort Hood.

Data from the computer, such as how often a button or switch is used, are balanced against soldiers' comments and videotapes about the location and use of the button or switch. Various uniform postures are used, including mission-oriented protection posture 4 and cold weather, to isolate specific problems related to the wear of gloves, heavy clothing, and gas masks.

"TEXCOM and these soldiers are making a difference in causing the fielding of a better system," Dr. Geddie explains. He said, "It is far more inexpensive to find and fix problems before production than after."

Doing the test in phases allows the contractor to find problems, resolve and make fixes, and come back for another phase to find out how well the soldiers adapt to the fixes.

A similar method of testing by simulation was used in the early stages of the RAH-66 Comanche helicopter program. According to TEXCOM officials, operational testing in the future will be seeking more ways to use simulation to achieve the best possible product for the soldier in the field.

Mr. Hair is the TEXCOM Public Affairs Officer, assigned to TEXCOM, Fort Hood, TX.

Test and Experimentation Command

Readers may address matters concerning test and experimentation to: Headquarters, TEXCOM, ATTN: CSTE-TCS-PAO, Fort Hood, TX 76544-5065

U.S. Army Class A Aviation Flight Mishaps

Fiscal Year	Number	Flying Hours	Rate	Army Fatalities	Total Cost (in millions)
FY 91 (through 30 April)	37	748,440	4.94	33	$136.0
FY 92 (through 30 April)	14	687,576 (estimated)	2.04	6	$50.9

The ATS L-Series TOE

by Captain (CPT) Ricky Sims
and
Staff Sergeant (SSG) Dale Walters

The living (L)-series table of organization and equipment (TOE) is on the way; it has taken a long time to get here. The L-series concept is clear; it must support the AirLand Battle umbrella concept and the combined-arms team. These TOEs support the four functions of air traffic services (ATS)—planning Army airspace command and control (A^2C^2), terminal operations (ground-controlled approach [GCA]/tower), en route (flight coordination center/flight operations center), and forward support (tactical teams).

The Department of the Army approved the L-series TOE on 9 October 1991. However, it will not be implemented into the Army authorization document system until fiscal year 1994.

This new TOE will change the way our ATS force is currently structured. The most notable of these changes listed in the following paragraphs, are based on a wartime strength of 100 percent.

Few alterations are made to the group- and battalion-level TOEs. The L-series Headquarters and Headquarters Detachment (HHD), ATS Group (TOE 01422L0), provides command, control, communications, and staff planning for all units organic or attached to the group. The battalion HHD provides similar support for all units organic or attached to the battalion.

The largest change is at the company level. Essentially, what was once a platoon is now a company. Four variations of the company TOE are authorized under the L-series with the basis of allocation being one company per division—

- TOE 01427L1, when organized for assignment to a division.
- TOE 01427L2, when organized for assignment to an air assault division.
- TOE 01427L3, when organized for assignment to a corps.
- TOE 01427L4, when organized for assignment to a theater.

Under the L-series TOE, divisional-ATS companies are organized with personnel and equipment to support the terminal, en route, A^2C^2, and forward support missions.

Corps' ATS companies are structured to support the terminal, en route, and forward support missions. The A^2C^2 function at the corps will be performed by the battalion A^2C^2 element.

The air assault company supports terminal, en route, A^2C^2, and forward support missions with six forward support teams for the air assault division mission.

Theater ATS companies support only the terminal functions, with four terminal platoons containing a headquarters section, tower teams, and GCA teams.

One obvious comparison involves the personnel arena. The J-series forward-support platoon is staffed with 38 personnel for combat operations. The L-series divisional, ATS-company combat strength rises to 50 personnel. This increase is due to the additional personnel required to maintain company operations. Several examples are a headquarters section, including a company nuclear, biological, and chemical noncommissioned officer (NCO); armor NCO; and a motor maintenance NCO. A company supply and wire section is also authorized.

One significant departure from the J-series TOE is the authorization for an A^2C^2 section. This section is manned by an aviation captain air traffic control (ATC) liaison officer and a sergeant first class (93C40) ATC liaison NCO. Units will no longer be required to provide organic personnel, (that otherwise must provide a separate wartime function), to support higher headquarters A^2C^2 cells.

The current 256th Signal Support Company, Fort Rucker, AL, H-series TOE does general support maintenance duties under the Signal flag. But with the L-series TOE, the 256th will be redesignated under the aviation umbrella. The general support/specialized repair activity company will increase in personnel (75) to support the multitheater mission.

Until the L-series TOE is integrated into our smaller, smarter Army, ATS units everywhere will continue providing the aviation community with dependable, technically proficient, and combat-ready ATS.

CPT Sims and SSG Walters are assigned to the U.S. Army Air Traffic Control Activity, Fort Rucker, AL.

U.S. Army Air Traffic Control Activity

Readers are encouraged to address matters concerning air traffic control to: Commander, USAAVNC, ATZQ-ATC-MO, Fort Rucker, AL 36362-5265

Command Sergeant Major Fredy Finch Jr

Personnel Management During Army Drawdown

During a recent trip to Panama, I received an interesting briefing from a young maintenance officer who knew how to define a problem. He really drove his point home when he explained a simple chart that calculated his soldiers' time in man-hours.

The officer used three bar graphs: one depicted authorized man-hours, one showed available man-hours, and one showed onhand man-hours. The graphs clearly revealed that only 40 percent of the onhand man-hours were available! Maintaining 100 percent of a unit's equipment with 40 percent of the assets is an impossible feat.

That one simple illustration of a complex problem sent me another very simple message—we senior leaders must rethink the way we do business as we drawdown our Army. We must rethink many of our programs and policies, especially those that interfere with basic missions. Drastic changes in our thinking may be required as we attempt to do better with fewer resources. Innovative thinking must be encouraged as we emphasize quality, not quantity.

Innovative thinking allows good leaders to ask, "Is this necessary? What is the impact on our mission/people? How can we do this better? What is the desired result?"

Is it truly necessary, for example, for all soldiers in a unit to do physical training five times per week, or does the standard measurement of passing a semiannual physical fitness test suffice? Because you are assigned to an infantry division, do all soldiers have to march 12 miles in full gear once a quarter, or do we base our standard on mission essential task list (METL) tasks and duties so that some soldiers could better serve the command by remaining on the job?

Do we continue to have ritual guard mounts at places we do not need guarding? Do we really need soldiers on charge of quarters duty, all night, down to the lowest unit level, at every unit in the Army?

Remember that once we were a young Army of mostly unmarried male draftees. But no more, because drastic changes in our society required innovative thinking. We were once an Army on horseback, but drastic changes in technology required us to adapt to faster-moving equipment. Like most old Armies, we once had the infamous kitchen police duty. We once issued weekend passes to go off post, and even sacred traditions like the beloved old brown shoes were forced into exile by changing times.

For the aviation career field, we need to address issues such as how the Army of Excellence tables of organization and equipment reduced the number of assigned mechanics to a level at which it is difficult to maintain readiness standards. Doctrinal issues found in Field Manual 25-101 need application to aviation soldiers and their individual METL training. We need to relook fairness issues in the use of duty rosters, and perhaps use the fair-share "percentage tasking" method to keep from wasting much-needed talent. The idea allows the first sergeant to take a required duty, apply a percentage down to platoon level based on numbers of soldiers eligible, and task a "fair share" for actual duty. The platoon sergeant, in turn, gains latitude to keep his phase team intact, and to schedule work loads and flows without disruption of quality maintenance support to the command. The result is that the platoon sergeant has the soldier pull the duty that he can most easily afford to lose from the duty section. Both missions get done through innovative thinking, because reasonable goals are set based on actual staffing levels.

Briefly stated, the idea of training smarter, not harder, makes sense. Drastic changes such as our Army's drawdown may require drastic actions, but those actions also require clear and well thoughtout innovative thinking. I challenge noncommissioned officers to the task. We must keep the soldier on the aircraft and not out "painting rocks."

illustration by Douglas Harrison